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Anesthesia

By CHARLES GREATLEY SAUNDERS, D. S. O., Major Canaidan Army Veterinary Corps, London, Eng.

Anesthesia has in the past been employed too little, partly no doubt because of the extra cost involved and partly as the result of a fear of untoward results. That this fear of fatalities from the anesthesia is practically groundless, if the best chloroform or ether is used and a fair knowledge of the physiology of anesthesia attained, has been proved amply by my own experience in the anesthetizing of hundreds of cases. Anesthesia has been looked upon too long as a luxury or something too mysterious for the ordinary practitioner to meddle with. Truth is that for scientific modern surgery as well as for humane reasons, it is essential and for aseptic surgery, indispensable. No operation can be carried out as is should be if the operator is handicapped by a groaning, struggling, straining patient, whose every movement not only alters the anatomical relations of the structures in the operative field, but fills the air with flying particles of dust and hair.

While it is true that many minor operations can be carried out with a local anesthetic, general anesthesia is in the majority of cases much to be preferred; the complete relaxation of parts and the avoidance of movement (usually occurring at inopportune moments) gives the surgeon a command over the situation that is of inestimable advantage. Very little, if any, time is gained by the use of a local anesthetic, when everything is taken into consideration. Further it is an undisputed fact that the injection of a local anesthetic in or around the wound area does with certainty retard healing, to say nothing of the increased risk of infection. However, there are, of curse, exceptions to every rule, and in some circumstances the use of a local anesthetic is quite satisfactory, especially where nerve blocking its practicable and the solution is kept away from the operative area. In cases where asepsis cannot be expected and healing by first intention is not possible, there is no objection to the injection of anesthetic solutions into the operative field, as for example, the injection of a solution of adrenalin under the skin before making the preliminary incision in the operation for the relief of paresis laryngis, enucleation of the eyeball, sinus operations, etc.

General Anesthesia

For inducing general anesthesia in equine patients chloroform without doubt is the most satisfactory agent, provided that only the purest and best obtainable product is used. Commercial chloroform gives no satisfaction and is positively dangerous to use; therefore, far dearer in the long run than the higher priced pure product. Any false economy in this direction will only end in disaster and cannot be too strongly deprecated. With the proper chloroform, one and one-half to six ounces

are sufficient to induce and maintain anesthesia for any ordinary operation on the normal animal. However, there is always the individual idiosyncrasy of the animal to be considered, and it is next to impossible to lay down any hard and fast rule as to the exact amount that will be required.

The patient should invariably be cast or secured on the operating table before attempting to administer a general anesthetic. No doubt, horses have been chloroformed standing, but unless there is unlimited space for the animal's peregrinations while going under, it is safer both for the patient and for the operating room equipment to have the animal properly secured. In securing the animal care must be taken that the respiratory organs are not hampered with ropes or girths. Assistants should not be allowed to sit or lean on the the patient and it should be possible to cast everything free speedily if need be. After the patient is secured and before attempting to administer the chloroform, the nostrils must be well smeared with vaseline both inside and out, to prevent blistering and irritation.

There are two methods in general use by which chloroform is administered, the open and the closed. The open method is safe and more scientific, but requires more of the drug and is more difficult to manage, the patient takes longer to go under and the anesthetist has to be on the qui vive to keep him under. On the whole the closed method is the more practical provided that the respirations are watched carefully and the drug is not pushed injudiciously and provided that the anesthetist is conversant with the physiological and toxic actions of the drug.

It should be remembered that chloroform kills by respiratory and cardiac paralysis in the order named, so that the character of the respirations is the main thing for the anesthetist to watch throughout the operation. The corneal reflex gives information as to whether anesthesia is complete or not but does not indicate the depths to which it has been pushed. Widely dilated pupils and shallow jerky respirations are ominous danger signals and the patient should have the chloroform mask removed and allowed a full supply of air, the tongue should be pulled forward and artificial respiration persisted in until breathing becomes normal again.

With ordinary care and with good chloroform, mortality is very low but may mount up to six per cent if an inferior drug is used. Bearing in mind the manner in which chloroform kills, sudden deaths occurring before the patient has reached the anesthetic stage can hardly be attributed to the chloroform but rather to reflex cardiac arrest from shock. Thus there appears to be more danger in commencing an operation before the patient is well under than in waiting until the reflexes are abolished. The after effects of chloroform on equine patients are practically nil in cases where anesthesia has been properly carried out and only the pure drug used; on the other hand, where an inferior chloroform has been employed and the administration unduly prolonged, bronchial and pneumonic troubles very frequently ensue.

Ether is more expensive, more difficult to administer, and more prone to cause bronchial trouble later on than chloroform and in equine patients at any rate, has little to recommend it.

Administration—Open Method

Apparatus required:

Before commencing an anesthesia one should have at hand a six-ounce drop bottle, chloroform, gauze six thicknesses and one foot square, one square foot mackintosh sheeting, vaseline, two ounce bottle liquor ammonia fortior, small sponge, hypodermic syringe, solutions of strychnin sulphate, adrenalin hydrochlorid and a pail of hot water.

Technic:

The patient being properly secured, the upper nostril well smeared with vaseline and the square gauze spread over it, keep the gauze in place with the left hand and also regulate the air supply through the lower one by closing with the fingers or allowing it to remain open. The chloroform should be dropped on the gauze from the drop bottle, at first rather rapidly until about one to two drams have been administered, when the under nostril should be closed with the fingers of the left hand and the gauze and upper nostril covered with the mackintosh sheeting; after a slight pause, about half an ounce of

chloroform should be dropped on the gauze and it should be covered again with the rubber sheet. The patient should be just about under by this time and the under nostril should be allowed to open as unconsciousness supervenes, the rubber sheet should be removed and the chloroform dropped on sufficiently fast to keep the patient under. The administration must be watched so as to just keep the patient well under but no more.

Closed Method

Apparatus required:

Chloroform muzzle, sponge, rubber sheet, chloroform, vaseline, liquor ammonia fortior, solution of adrenalin hydrochlorid, solution of strychnin sulphate (½ grain to 5 c. c.), hypodermic syringe, graduated four ounce measure, and a pail of hot water.

Technic:

The patient being properly secured and both nostrils well smeared with vaseline, both inside and out, the muzzle should be adjusted and the sponge previously wrung out in hot water placed in the lower end of the muzzle. One and one-half ounces of chloroform are poured on the sponge, the end of the muzzle closed and the whole of the nose and muzzle enveloped with the rubber sheet. The patient as a rule struggles violently but passes rapidly through the first and second stages of anesthesia into the anesthetic or hypnotic stage. Should this latter not be complete after a reasonable interval and the patient show signs of coming out, another half ounce of chloroform should be poured on the sponge and the muzzle again tightly closed. Anesthesia is maintained by the addition of chloroform one dram at a time. It must be remembered that by this method the patient gets practically no air so that in prolonged operations or at any time the condition of the patient indicates it, air should be allowed. When anesthesia becomes profound, the chloroform should be given and the muzzle closed only when signs of returning consciousness are evident, the muzzle being opened up directly complete anesthesia is obtained. Should the respirations become shallow and irregular, the administration of the chloroform must cease at once, the muzzle must be opened, and a whiff of ammonia given, half a grain of strychnin sulphate administered subcutaneously and artificial respiration instituted. Should these measures not prove effective promptly, 5 c. c. of adrenalin hydrochlorid solution should be given intravenously.

In spite of its crudeness, this method has proved very practical and when good chloroform is used, quite safe, provided that ordinary care and common sense is exercised. The desire to hurry the anesthetic must be restrained and each succeeding addition of the drug must be given reasonable time to exert its effect before more is added. The operator should not commence his work until the anesthetist is satisfied that the patient is completely under or sudden death from shock may be the result. The anesthetist must give his attention wholly to the anesthesia and not act as assistant to the operator in addition to administering the anesthesia.

Local Anesthesia.

The principle involved in inducing local anesthesia is that of paralyzing the nerve endings of sensory nerves, either by direct contact between them and the anesthetizing agent or by cutting off sensations in the nerve terminals by paralyzing the main nerve trunks. This latter process is termed nerve blocking and is to be preferred whenever the anatomical situation permits of its application.

The main reason for this preference for nerve blocking over what might be termed in contact anesthesia, is that in the first place where possible at all, it is much easier and quicker in application, more certain in its results, more easy to control and in no way interferes with the operative area. It does away with the risk of infection in the tissues in the region of the wound and does not retard healing as the local application invariably does. Nerve blocking is most usefully and generally applied in inducing anesthesia for operations on the limbs, such as nerving, firing, tenotomies, quittors, etc. In contact anesthesia may be employed for such operations as tracheotomy, ablation of tumors, extirpation of the eyeball, entropion, ectropion, etc.

Neither nerve blocking nor in contact anesthesia is effective for such maior

operations as resection of the ligamentum nuchæ, sinus of the withers, operation for paresis laryngis, etc.

A fleeting but effective anesthesia is obtained by the use of ether or ethyl chlorid spray. Such anesthesia is produced by the cooling of the tissues and nerve endings by the rapid evaporation of the extremely volatile ethyl chlorid and the slightly less volatile ether. This manner of producing anesthesia is limited to operations of very short duration, such as the opening of an abscess, since if carried too far the tissues become completely frozen and sloughing results.

Ethyl chlorid anesthesia is sometimes useful to anesthetize the point of puncture, when about to make an injection into a nerve sheath or infiltrate an area to be operated on. This, however, is necessary as a rule only in very nervous or vicious animals, in which case local should give way to general anesthesia.

Drugs Used for Producing Local Anesthesia.

Among the well known drugs exerting a paralyzing effect on the nerve endings of sensory nerves and so receiving their designation of local anesthetics are cocain, eucain, stovain and novocain. The latter far outdistances the older drugs on account of its stability, low toxicity, reliability in the production of anesthesia and the ease with which it is sterilized. Solutions of novocain are easily sterilized by boiling and keep well and can be injected in considerable quantities without fear of untoward results from poisoning. It should be the choice of every up-to-date surgeon as it has proved its worth in practice.

The addition of adrenalin hydrochlorid to the solution of local anesthetic increases its anesthetic power and by preventing rapid absorption into the blood stream, prolongs the duration of the anesthesia. The adrenalin also has the advantage of giving the operator a dry wound as capillary oozing is prevented by its constricting action on the blood vessels.

As adrenalin solutions do not keep well, it is advisable not to make up more of the combined solution than is required for the day's work. Novocain solution, however, can be made, sterilized and kept on hand without fear of loss, if placed in sterile bottles properly plugged with sterile wool. A convenient strength for novocain solution is a four per cent solution in sterile water to which one mg. of adrenalin is added immediately before use and diluted with normal salt solution as required (09). A ten per cent solution is used for nerve blocking and for painting on a mucous membrane and only a few drops are required to produce anesthesia. The lower percentage solutions can be used more freely and if necessary to anesthetize a large area, one per cent or even one-half of one per cent solution can be employed.

Apparatus required:

Hypodermic syringes, 5 c. c., 10 c. c. and a 5 c. c. dental syringe, hypodermic and dental needles. The choice of a syringe is of some importance if the operator would spare himself a lot of unnecessary trouble and vexation. The only syringes worth considering are those with a glass barrel and ground-in metal plunger, the all metal syringe, or the all glass syringe.

Syringes with leather or asbestos plungers should not be used. They are difficult to sterilize, seldom fit properly and leak when pressure is applied. The glass syringe has the disadvantage of being easily broken and is expensive but is the most satisfactory to use and is, therefore, recommended.

For infiltration work, a rather long needle of small calibre is the most useful. However, it is often convenient to make the first injections with a shorter needle in order to prevent breakages from the patient's resistance. For this purpose the ordinary dental needle answers perfectly. When the superficial structures are anesthetized, the longer needle can replace the short one in order to reach the deeper tissues.

For nerve blocking the dental needle is the most suitable as it is long enough to reach any nerve, except in extraordinarily fat animals, that it is desirable to block.

The points of needles intended to be used for local anesthesia should not have a very long bevel but should be extremely sharp. Whether the needles slip on, or screw on to the syringe is a matter of individual choice; the author prefers the screw-on type in spite of its disadvantages because the slip-on needle so often slips

off when pressure is applied to the plunger for making a deep injection or when working in situations where the skin is thickened up or closely adherent to the bone.

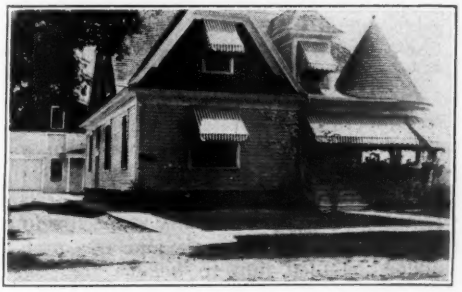
Screw-on needles with a short rubber connection are most suitable as the danger of breakage from movements of the patient is minimized, and the flexible rubber tube enables the operator to more easily alter the direction of the injection than in the case of a needle rigidly attached to the syringe.

Technic of Anesthetizing the Operative Area.

The exact method to be followed to produce local anesthesia of the operative field must of necessity vary with the operation to be performed and the extent and situation of the tissues to be invaded; but the general principle to be followed is to so place the injections as to cut off all sensation from all sides. This is accomplished after the method of Braun, by first of all raising a skin wheal by injection of a few drops of the anesthetic solution intradermally and then injecting successive layers of tissue from the wheal. After the raising of the wheal, a needle sufficiently long to reach some little distance below the depth of the proposed incision or dissection, is attached to the syringe and pushed through the wheal in an oblique direction to the estimated depth, and in the long axis of the line of incision. Pressure is applied to the piston of the syringe during the passage of the needle to the depths thus forcing out the solution into the tissues enroute. The needle is then slowly withdrawn, injecting all the way, as far as the wheal but not from the skin.

The next layer of tissue is injected in the same manner and so on until all have been injected including the actual line of incision in the skin, which should be the last injected. In long incisions it is convenient to carry out the successive injections either from a central wheal or from one at each end. In the latter cases care must be taken to make sure that the injections overlap or anesthesia will be incomplete.

In applying local anesthesia for the removal of tumors or new growths and especially in cases where deep dissection is expected, it is best to work from a wheal at either extremity of the line of incision, the two lines of injection meeting under the tumor. The needles are then directed (from the wheal) so as to meet at a point corresponding to the center of the tumor but well to the side of it. This is done on each side, layer by layer, so that the tumor lies as it were in a trough of anesthetized tissue. The skin is then injected, first from either wheal and up to the periphery of the growth and then around its circumference. The needle should not be withdrawn from the skin once the injections are begun but only pulled back to the wheals and again directed in the desired direction. The solution should be continuously injected both when pushing the needle in and while withdrawing it to the wheal. For a small area, or for purely skin anesthesia, the five per cent solution is suitable, but for more extensive procedures, a strength of two per cent should not be exceeded. In anesthetizing areas where the skin is quite close to the bone as on some portions of the face or skull, the injections should encircle the operative field and the needle should be pushed as close to the bone as possible. This can be effected by raising a succession of wheals in a circle or by raising two wheals and mapping out a diamond shaped area instead of a circular one. It is immaterial which of these two methods are used, so long as the operative field is isolated by a barrier of anesthetized tissue.



Hospital and residence of Dr. F. D. Markham, Port Leyden, N. Y. Ten rods back of the hospital flows Black River, and rising beyond it are the foothills of the Adirondack Mountains.

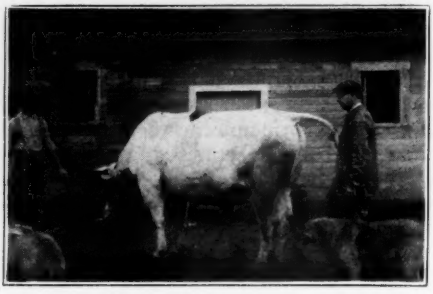
Dr. A. Whitlaw, formerly assistant to Dr. J. T. Waite of Fenton, Iowa, has moved to Germania, Iowa.

The Intradermal Tuberculin Test

By CLIFF ACKLEY, D. V. M., State Veterinary Inspector, Olympia, Wash.

During the past seven or eight years the intradermal tuberculin test has been coming into greater favor, not only in the hands of the practicing veterinarian, but also among the various state departments of agriculture. The veterinarian who has used this test a few times dreads to return to the slow, tiresome task of taking temperatures every two hours, while the farmer or stock owner who has once had his cattle tested by the later method does not like the system which requires confinement of his stock to their stanchions for the long period of time necessary in the subcutaneous tuberculin test.

1. An unusually well marked intradermal reaction. This animal when posted had extensive caseocalcareus deposits in the post-pharyngeal lymph glands, which were enlarged to about the size of baseballs. (The "bull" on the left is Dr. Ackley.)



2. Another view of the same reactor. Note the distance at which the reaction is easily observable.

The popularity of the test, however, is not as surprising to its advocates as the reluctance of the United States Bureau of Animal Industry, some states, and many practitioners show in taking up the later test. While the writer does not wish to pose as an expert in this work, personal experience in the use of both the tests, while employed as veterinary inspector for the B. A. I., in state work, and as a practitioner, has led him to believe that the intradermal test is far superior in every way to the older method. Chief among these advantages are the following:

Speed.—The rapidity with which the cattle of a county or section of country can be tested out by this method is a great advantage over the subcutaneous method. Statistics show at the present time that about 2 per cent of the cattle and over 7 per cent of the swine in the United States on an average are affected with tuberculosis. If the disease is to be eradicated, or even kept under reasonable control, either an immense number of inspectors will be required with the old test, or the intradermal must be used. It is doubtful, even if funds were to be obtained, if there is at present enough available veterinarions in the country to handle this work properly with the subcutaneous test.

Accuracy.—Neither test is infallible, but Missouri, Washington and other states have been able to show from 97 to 98 per cent of the cattle condemned under the intradermal test with lesions of the disease. In view of the fact that many of these cattle are posted by country veterinarians who have not had the advantage of packing-house experience, and who are without proper knowledge of the lymph system, this record is remarkable. Even the fact that no lesions may be found does not prove that a condemned animal is not tuberculous, for there must certainly be a lapse of time between infection and the deposit of macroscopic caseous or calcareous deposits in the glands.

In the subcutaneous test many outside factors may cause sufficient variation of an animal's temperature so as to make the test almost, if not quite, worthless. Any veterinarian who has attempted to test herds containing young stock, unused to

confinement in the stanchions, has discovered how quickly the temperatures will mount up. Calving, excitement, lack of water, or too much cold water, all of these

3. An O. I. C. herd boar with an unusually prominent reaction. Calcareus deposits were found in the cervical and mesenteric lymph glands.

and other factors will cause remarkable variations in temperature with individual animals. Often in testing large herds with the subcutaneous method one or more cattle can not be tested because of high preliminary temperatures. None of those things influence in the slightest degree the intradermal test. Personally I have tested sick animals, "pulled" a calf which was being with difficulty delivered, so as to inject, had numbers of cows come fresh between times of injection and reading of the intradermal test, and have never in any of these cases found a reactor which did not show lesions.

It is possible of course to make mistakes in reading the intradermal test, as well as in using the subcutaneous Swellings occasionally occur at the site of injection which are not reactionary swellings. The majority of those are caused, I believe, from the puncture with the needle of small arterioles or veins, causing an infiltration of serum into the tissues. Secondary infection is possible, but the percentage of these cases is remarkably small. In doubtful cases, it is safe to fall back on the subcutaneous method as a check, for the small amount of tuberculin used in the intradermal method in no way interferes with the use of the larger amount used in the old test. On the other hand, it is doubtful if a doubtful case under the subcutaneous method, can be immediately retested with accuracy by the intradermal test.

The accuracy of either test must of course depend largely upon the operator, but all things being equal, I believe the man who has practiced both tests and has attained a fair degree of proficiency in the work, will meet with less perplexing problems and make fewer errors with the intradermal than with the subcutaneous.

Expense.—The smaller amount of tuberculin used, the rapidity of the work, and the convenience to the operator, make it much less expensive to apply the intradermal test. In private practice many farmers are willing to have small herds tested and pay a fair charge for the service with the intradermal test, but I fail to remember one who did not kick on the fee charged for the subcutaneous test. This is also an advantage to public institutions, who are expected to perform a maximum amount of work with a minimum of appropriation.

Testing of Swine.

Sooner or later it is going to be neces-

4. This sow has an unusually good reaction extending over one quarter of the surface of the ear. It is hardly visible in this picture and had to be felt to find the extent of the reaction.

sary to take more active steps in eradicating tuberculosis in swine. Of course the elimination of cattle tuberculosis, if coupled with sanitary measures on the farm, will be a large factor in this accomplishment. But many brood sows are tuberculous, and undoubtedly pass the infection on to their suckling pigs. The use of the subcutaneous test in swine has proved entirely

impractical, due to the difficulty of restraint and the great variations of temperatures in swine.

I find very little written or reported on the use of the intradermal test among hogs, but from recent personal experience believe that it contains great possibilities. In a recent test eight reactors were taken from a herd of swine, composed of 108 head ranging from three to six months of age, and 21 mature hogs. In this test eight animals reacted to the test, and all showed lesions on post-mortem. As this is a privately-owned herd it is impossible to state whether all tuberculous animals reacted or not, but I am inclined to the opinion that they did.

In this herd no reactors were found in the pigs four months of age or younger. Whether this is because these young animals will not react, or because none were infected, I am of course unable to state. The owner informed me that at about the time these pigs were littered he had discovered the infection in the herd, and had cleaned and disinfected his pens. This may or may not be true; taking this man's statements on other questions I have grave doubts of anything he says.

The site of injection on swine is the thin skin on the back of the ear. Any point may be used, but the parts near the head are less likely to be interfered with by traumatisms. In the animals observed by me reactions appeared in 48 hours, but persisted until the 72d hour, which is the usual time for reading the test with cattle. When slaughtered, five days later, some of the reactions had entirely disappeared, while all were less prominent than on the 48th hour.

In reading the intradermal test on swine, great care is necessary to ascertain the reactors, for only careful feeling and pinching up of the skin will reveal the reaction in some cases. In others, the swelling is easily seen at quite a distance.

It is to be hoped that some institution with available funds will see fit to further investigate the use of the intradermal test in swine; there is much to be learned, and the time is fast coming when valuable practical use can be made of knowledge so gained.

Glanders

By LIEUT. G. H. CONN, V. C., Camp Taylor, U. S. A.

On April 3rd, 1918, a clinical case of glanders was discovered at the remount, from which the following records were taken during subsequent testing of the animals at this post for glanders by the ophthalmic test. Until this case was discovered, this remount was thought to be free from glanders, but a large percentage of the animals at this post at the time had been there for several months, and due to the severity of the weather, the corrals were very muddy; further, it was impossible to clean them.

The corrals were numbered from one to six and from ten to twenty-one, consecutively. In addition to these there was a pack train, a maternity corral (where the mares and their colts were kept), a wagon train corral and a stable for the various details and for officers' horses and, in addition, the veterinary hospital corrals.

The corrals, thirteen, fifteen and seventeen, were in much the worst condition; these animals had been the longest in the remount and it was from them that we obtained the greatest number of reactors. Among all the cases of glanders at this depot, as shown by the following records, not one case was found either in the pack train, maternity corral, wagon train or mount corrals. None of these animals were fed or watered where they could come in contact with animals suspected of having glanders or animals in the corrals in which glandered animals had been discovered.

In May, the division at this camp was ordered overseas and turned in to the remount depot about six thousand animals. This raised the total to almost twelve thousand. To be exact, there were 11,780 animals at this depot during May, 1918.

From April 3rd to May 10th there was a grand total of 9,500 ophthalmic tests made, with 3 positive and 122 suspicious reactors to the first test. From these 122 suspicious reactors, 27 were quarantined

as contacts, for test 21 days later. From the remaining 95 suspicious reactors blood was drawn, and the result of the complement-fixation test was 52 positive and 12 suspicious reactors. The remaining 19 animals, from the 122 suspicious reactors, were treated as contacts, so the 19 animals and the 12 suspicious reactors to the complement-fixation test, were quarantined with the 27 contacts from the original ophthalmic test. This made a total of 58 contacts held in quarantine during the period from April 3rd to May 10th. From the 58 contacts held in quarantine, 9 animals reacted to the ophthalmic test at the end of the quarantine period. Thus we have a total of 64 positive reactors to all tests during the entire period. These 64 animals were destroyed, and upon post-mortem examination, 59 of them proved positive and the remaining 5 negative.

A marked case of farcy or cutaneous glanders. Owing to the careful supervision of army horses and the prompt elimination of cases of glanders, it is rare that any progress to this stage.

During the period beginning may 11th and ending July 31, 1918, a grand total of 15,599 ophthalmic tests were made. Of these tests, there was 23 positive and 628 suspicious reactors to the first ophthalmic test. Upon retesting the 628 by the ophthalmic test, 31 positive reactors were found. From the remaining 597 suspicious reactors, 62 positive reactors were found by the complement-fixation test.

During the period beginning April 3rd and ending July 31, 1918, a grand total of 180 positive reactors to all glanders tests were found.

Each animal before being subjected to a glanders test was given a physical examination, and, during the entire period 17 clinical cases were found. As the clinical cases were destroyed according to regulations, they were not given any tests, and, so are not figured in the tests. Thus we had a total of 197 cases of glanders in the depot, but only 180 of them found by tests applied; hence, all percentages will be figured on the basis of 180 reactors to all tests applied for glanders.

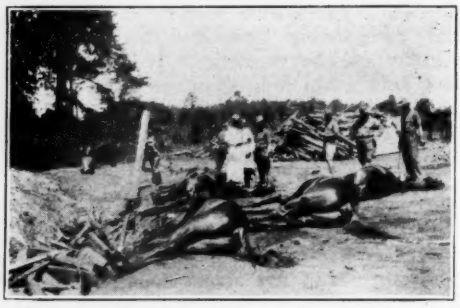
During the entire period, blood was drawn from 692 animals, and, sent to the laboratory for the complement fixation test. From this number there was a total of 114 positive reactors. Thus 16.32 per cent of the animals that reacted to the ophthalmic test, proved positive on complement-fixation test.

Quick work by the photographer. The horse is dead and already falling. The revolver has rebounded.

Of the total number of tests made, less than one-third of one per cent proved positive to the ophthalmic test. A grand total of one hundred and ninety-seven animals reacted to all tests and to physical examination, making almost four-fifths of one per cent.

Of the total number of reactors to all tests and physical examination 42 per cent was discovered by the ophthalmic and 49 per cent by the complement-fixation test. The number of suspicious reactors to the ophthalmic test was 3 per cent of the total number of tests. The number of animals that reacted suspiciously to the ophthalmic test and that later proved positive to the complement-fixation test was 16.32 per cent.

A total of one hundred and ninety-seven animals were destroyed, including



All animals killed because they have reacted to the mallein test are autopsied and a report of the post mortem findings on each case made a part of the permanent records of the veterinary corps.

the clinical cases. Of this number, eighty-three head, or forty-two per cent, reacted to the ophthalmic test, 49 per cent to the complement-fixation, and nine per cent exhibited clinical symptoms on physical examination. Of this number, one hundred and sixty-one or 89 per cent proved positive; seven or 3 per cent, were suspicious and thirteen, or six per cent, were negative on post-mortem examination.

On post-mortem examination, the horses showed the lesions as follows: On nasal septum, 9; in submaxillary lymph glands, 6; in prescapular lymph glands, 26; in bronchial lymph glands, 76; in mediastinal lymph gland, 15; in lungs, 85; in liver, 8; in spleen, 2. Thus, seven per cent showed lesions on nasal septum; 35 per cent in the submaxillary glands; 20 per cent in the prescapular glands; 58 per cent in the bronchial lymph glands; 11 per cent in the mediastinal lymph glands; 65 per cent in the lungs; 6 per cent in the liver; and 1.6 per cent in the spleen.

On post-mortem examination, the mules showed the lesions as follows: On nasal septum, 2; in submaxillary lymph glands, 5; in prescapular lymph glands, 1; in bronchial lymph glands, 7; in mediastinal, 0; in lungs, 6; in liver, 0; in spleen, 1. Thus 1.6 per cent showed lesions on nasal septum; 38 per cent in submaxillary glands; 4/5 of one per cent in the prescapular lymph glands; 53 per cent in the bronchial lymph glands; 46 per cent in lungs; 4/5 of one per cent in spleen.

It was demonstrated by post-mortem examination that glanders was more acute in the mule than in the horse; that generalized glanders was more common in them than in horses, and that the rapidity with which it developed was more pronounced than in the horse. Post-mortem examination of the last few animals showed marked diminution in the lesions found. The degree of the reaction either from the ophthalmic or from the complement fixation test was in no case indicative of the severity of the lesions found on post-mortem. A slight reaction bordering almost on the line of demarcation between a positive and negative reaction, many times demonstrated as many lesions on post-mortem as a clinical case, the majority of which were recognized by the characteristic ulcer on the nasal septum. In the mule it is possible for glanders to manifest itself in a pronounced clinical case in a few days' time. I remember one mule that developed a very pronounced clinical case in five days' time. This mule was a peculiarly marked animal and was very thin, and was in the corral with animals that were being fed extra food to fatten them. The mule had been subjected to the test about two weeks before I had last seen him. I was detailed on other work for five days and upon my return to the corral on the sixth day I found the mule in very bad condition, with multiple abscesses in the region of the shoulders, hemorrhages from the nostrils and difficult breathing. This was the worst clinical case and most rapidly developed case I have ever observed.

The reactions from the ophthalmic test usually manifest themselves in from six or eight hours to thirty-six hours. The greater number will be found in readings up to the eighteenth hour. However, we found many reactions that were manifest from the forty-eighth to the seventy-second hour, and some even later.

Several things are to be taken into consideration in making the ophthalmic test of animals in the army, and especially those running loose in corrals. During muddy periods, pieces of mud often get into the eye, shreds of hay or chaff from the feed rack may gain access to the eye and set up inflammation. Changes in the weather and bruises or injuries received in the chute may produce violent inflammation while inflammatory conditions of the eye, due to influenza and like conditions, may lead to error in interpreting results of the test. At times the operator may introduce some foreign matter into the eye when using the camel's hair brush to administer the mallein. Too much care cannot be used when administering the mallein.

Animals that gave a suspicious reaction to the ophthalmic test were removed to a quarantine pen and there given the test in the opposite eye, and a sample of the blood sent to the laboratory to be examined. Here is awaited the result of the re-test and the laboratory test. The complement fixation test was used for the blood of the horses and the serum agglutination test for the mules.

The animals from the corral from which the suspects were taken were treated as contacts and were held in quarantine for the re-test at the end of twenty-one days. The suspicious animals from various corrals were isolated, so that the origin of any positive reactions could be traced and the animals kept properly quarantined.

Dr. Conn and Dr. F. J. Scheloski autopsying reactors to the mallein test. The one with the white gown and the hat is Dr. Conn, and the one without the hat is Dr. Scheloski.

One of the most disagreeable tasks of the veterinarian in the army was a detail for a few weeks on autopsies of mallein reactors, and it was dangerous as well.

In drawing the blood for the laboratory examination, the animal was controlled by means of a twitch. A small spot about the middle of the neck and just over the jugular vein was shaved and disinfected. A large caliber needle, either 16 or 18, was inserted into the jugular vein and the blood collected in ordinary test tubes, which had been previously sterilized. The tube was then plugged and labeled and numbered and a record made and a corresponding number placed on the animal for identification.

As soon as the animals from a corral were tested they were placed in a corral from which all the manure and debris had been removed. The hay and grain racks were then scrubbed with an antiseptic solution and a couple of inches of the soil scraped off and hauled away. The corral was then sprayed with two per cent kreso solution with a large street sprinkler.

Animals that react to either the ophthalmic or the complement-fixation test are destroyed immediately and a post-mortem examination made to demonstrate the extent of the lesions. The carcass is then

burned. This is best accomplished by digging a trench about three feet deep and two feet wide and across this at intervals of one and one-half to two feet, pieces of railroad iron are placed. Wood is placed in the trench. The animal is laid over the trench on the rails and surrounded with wood. Petroleum is then thrown over the mass and the fire started. This method has been found most satisfactory.

The animals were shot and there was often profuse hemorrhage. The ground that was soaked with the blood was covered with straw, over which oil was sprinkled and then set on fire. The halters were soaked for several hours in a five per cent solution of kreso.

INVESTIGATION OF "LESION-LESS" REACTORS TO TUBERCULIN

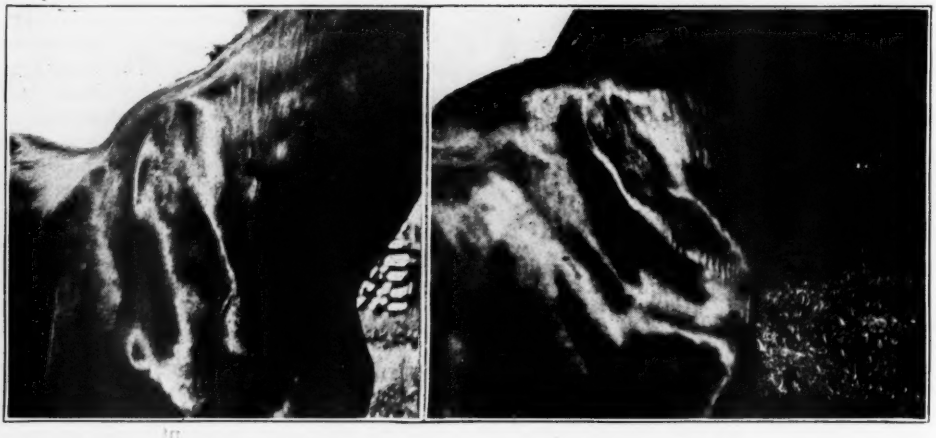
The pathological laboratory of the bureau of animal industry has been kept very busy of late with tests of commercial preparations and with the inspection of glands which, after slaughter because of tubercular reaction, have not disclosed to the post mortem the lesions of tuberculosis. One unusual manifestation of the disease which has led the officials in charge to urge the utmost care in post mortem examinations was disclosed in one of the best kept herds in the south which was an applicant for registry on the bureau list of tuberculosis free accredited herds. Of the two animals in the herd which reacted, one showed none of the usual lesions of tuberculosis but a close inspection of the carcass finally disclosed that one rib was slightly larger than its opposite. Inoculation of guinea pigs with cultures obtained from the rib produced tubercular manifestations which were conclusive.

The officials of the bureau are considering the advisability of urging the submission of the pharyngeal glands in all cases. These, which are the first attacked in hogs, have been somewhat slighted in ordinary tests of cattle, it is feared.

BLACK LEG PREVENTION

The laboratory, while continuing to put out the old powder vaccine for black leg, is experimenting with some filtrates to check the same malady.

Considerable work is also being done on dourine and glanders.



A pair of real ones, team mates, and each sweenied on the right shoulder. Their daily task was that of drawing heavy loads of tile over bad roads with none too good fitting collars, and it is more the latter that caused the injury. Sometimes we see teamsters using collars on horses that are several inches too long, and it is generally these fellows that have sweenied horses. Each of these patients was injected with equal parts of tincture of iodin and alcohol, using about 20 cc. on each animal, distributed over the area about 4 or 5 inches apart. This team was moved from my territory shortly after this and turned to pasture when I lost sight of them and do not know just what results were obtained. W. P. Bossenberger, Williams, Ia.

AMERICAN JOURNAL of VETERINARY MEDICINE

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The Price of the Journal

WITHIN fourteen months there have been three marked increases in the cost of printing in Chicago. The first 20 per cent, the second 15 per cent and the third 20 per cent, making, since the second and third increases applied on those that preceded, a total increase of 66 per cent over the prices in effect September 15th, 1918. In addition to this there has been an increase of 10 per cent in the cost of paper during this period. Fortunately not all the expense of making a magazine is for printing and paper, and the cost of other than the two items enumerated has increased less.

The present subscription price of $3.00 is inadequate, and has been for some time. An increase is inevitable. It would have taken effect January 1st, but for conditions that might make a price set now insufficient in a very short time to maintain the Journal. The printing trades have just given notice of a demand for an increase of wages greater than the three preceding increases combined and we will not know—no publisher can know—until this is settled, what printing costs will be. At this time we can only say that there will be no lowering of the quality of the Journal. When we know what to plan upon, such an increase will be made in the subscription price as conditions make absolutely unavoidable at the present standard.

After all an increase in the subscription is a relatively small matter to the subscriber. The subscription price of a journal is but a small part of the cost of the publication to the reader, at least we hope that such is the case with the AMERICAN JOURNAL OF VETERINARY MEDICINE. We don't consider our Journal is "sold" until it is read and to read it takes time. Our readers' time is worth money, and this is the principal cost of the Journal to them—the time it takes to read it and get the gist of it. We keep this constantly in mind, and labor incessantly to conserve the reader's time in assimilating the contents of the Journal. Our first thought is given to the selection of material for publication, and next comes the preparation and presentation of the information that it contains so that the reader may get it in the shortest time possible and without wading through nonessentials or impracticable matter, or matter not pertinent to the subject under discussion, or that is uninteresting for any reason whatsoever.

In our efforts to save time for our readers, subscribers tell us we have succeeded, and this is gratifying. It adds to the cost of producing the magazine, of course, but the saving to readers is very large in the aggregate.

In one particular subscribers can help us to keep down the cost of the magazine, and we urgently request them to be more thoughtful in this than they have been in the past. We refer to the matter of renewals. The most useless waste of time and money that we know of and as far as we know, the only waste in the publication of the Journal, is that resulting from carelessness and delay in renewing

subscriptions promptly, when due. The number who have given us the fullest co-operation in this has increased steadily from year to year. This is encouraging, and we are duly appreciative, but we are not satisfied; we ask all to renew their subscriptions AT ONCE, when they are due, and thus not merely lower but eliminate the high cost of renewals which does no one any good, but on the contrary is a burden on the whole publication and all its readers.

OUR INDEX FOR 1919

In this issue, as heretofore in the December issue, we include an index for all articles, case reports and discussions that have appeared in the Journal during the year of 1919.

It has required a great deal of labor to prepare this index with complete cross references to all subjects and divisions of subjects discussed during the entire year. We believe no equal number of pages in the volume for the year are of as much worth to readers. An increasing number of readers write us that they refer to back numbers of the Journal almost daily for information on matters that arise in their practices. All readers should avail themselves of the wealth of material to be found in this and previous volumes of the Journal; no one can assimilate and remember it all as it comes. It must be referred to again and again or much of it is lost. The index herewith is a perfect key to this invaluable store of practical, scientific, useful information on the whole subject of veterinary medicine.

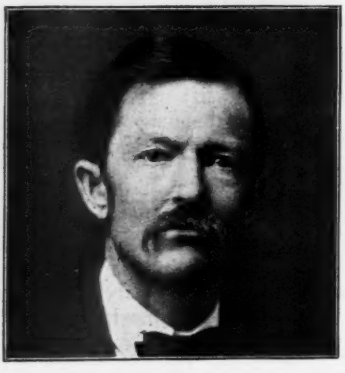
We point to this index with a great deal of pride. Note that it contains a list of more than 125 illustrations of an amazing variety of subjects; a list of more than 250 authors containing the foremost leaders in every field of veterinary endeavor; and more than a thousand titles—diagnosis, medicine, surgery, practice, prophylaxis, diseases of horses, cattle, sheep, swine, dogs, cats, rabbits, cage animals and poultry. No veterinary book has ever been published with such a wealth or variety of useful information for veterinarians. A work to contain what a volume of the Journal contains must be in truth an encyclopedia and would cost purchasers many times the subscription price of the Journal.

Use this index and use the information to which it is the ready key.

The A. V. M. A. Meeting in New Orleans

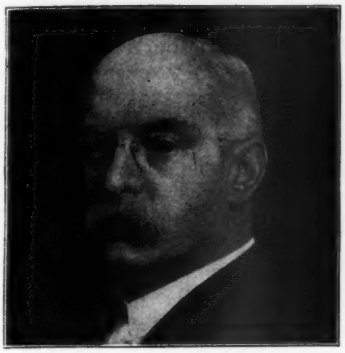
As we go to press, the 56th annual meeting of the A. V. M. A. is in session. A full account of matters of general interest concerning this meeting will be published in our January issue.

The prospects for a large attendance are good. Arrangements were made for two special cars from Chicago for a party from Illinois. Those making up this party were: Dr. and Mrs. N. S. Mayo and

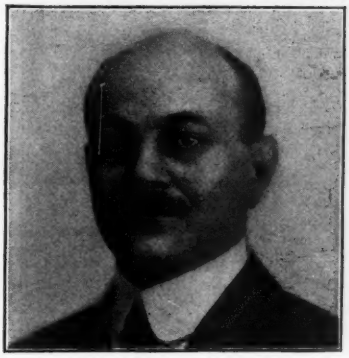


C. A. CARY
Elected president.

N. S. MAYO
Re-elected Secretary for the third term.



W. H. DALRYMPLE
Popular editor of the J. A. V. M. A.

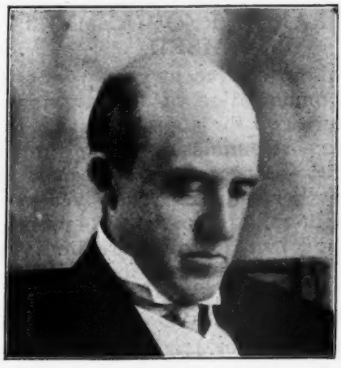


DR. ADOLPH EICHHORN
Who was much interested in having the Association invite the International Congress to meet in America next year.

daughter Eloise, Dr. and Mrs. A. H. Baker, Dr. and Mrs. J. T. Hernsheim, Dr. and Mrs. W. H. Welch, Dr. and Mrs. F. H. Burt, Dr. and Mrs. Geo. Gordon, Dr. and Mrs. F. A. Pilon, Dr. and Mrs. D. M. Campbell and daughter Dorothy, Dr. and Mrs. H. W. B. Aulgar, Dr. and Mrs. Glen D. Grogan, Dr. and Mrs. Chas. Frazier, Dr. and Mrs. W. Lester Hollister, Mr. and Mrs. Alex. Eger, Drs. Robt. Graham, J. V. Lacroix, D. E. Sisk, T. J. Foster, J. D. Reardon, Jos. Hughes, C. A. Zell, J. S. Koen, R. R. Gingerich, S. Kempf, Mr. J. P. Dunn, Miss M. Grow and Miss Ida Apeland.

At Effingham the party was joined by Drs. W. B. Craig, L. E. Northrup, J. D. McLeay and Mr. Carter, all from Indiana.

Among the early arrivals at the convention considerable interest was manifest in the impending election of officers. For president, just two candidates were discussed: Dr. C. A. Cary of Auburn, Alabama, and Dr. A. T. Kinsley of Kansas City. Doctor Cary had the unanimous support of the veterinarians of the South and strong support among the eastern delegates and among the state school men. Doctor Kinsley's following included prac-



G. H. GLOVER
Of Colorado. The Association's Champion Story Teller. He broke his own record by not inviting the Association to hold its next meeting in Estes Park.

COL. L. A. MERILLAT
Whose invitation to meet in Columbus in 1920 was accepted.

A. T. KINSLEY
Always has the "latest word" on swine practice.

tically all others from the North and those from the southwestern states.

The Indiana men were in no doubt as to who they wanted for president and were insistent in their demand for Dr. W. B. Craig of Indianapolis. The Missouri contingent arrived in New Orleans late Saturday night and their enthusiasm was contagious.

In the matter of secretary a scare was thrown into the camp of the dopesters by an early report that Col. Merillat, at the urgent solicitation of friends had consented to allow his name to be presented among the nominees. Before this rumor became current politicians were busy lining up "the solid South" and the state school contingent of the North for Dr. I. E. Smith of Baton Rouge, and Dr. N. S. Mayo's friends were seeing to it that all others were kept cognizant of his splendid record in the office of secretary for two terms.

JOHN F. DEVINE
The tallest and the pleasantest man at the meeting.

However, in the final summary, Doctor Mayo was re-elected secretary, Colonel Merillat declining nomination.

Dr. John R. Mohler's term on the executive board expired with this meeting and he had declined the nomination to succeed himself and had indicated a refusal to accept the office of Member at Large on the executive board in case there should be a vacancy, (by Kinsley's election to the presidency). Those that interest themselves largely in A. V. M. A. politics were thus pretty much at sea as to this office or these offices as the case might be. Not a few favored using the executive board positions as consolation prizes for unsuccessful candidates for president and for secretary, and so the political mill ground on and on before the meeting convened.

Late telegraphic reports are to the effect that there were five hundred members in attendance, and seven hundred new members elected. Colonel Merillat extended a cordial invitation to the association to hold its next annual meeting at Columbus, Ohio, and the invitation was accepted.

At the election on Tuesday, Dr. C. A. Cary was elected president, Dr. N. S. Mayo, re-elected secretary for the third term, Dr. M. Jacobs, re-elected treasurer.

ENTRANCE REQUIREMENTS RAISED.

According to a recent ruling, following the recommendation of the secretary of agriculture and the approval of the U. S. Civil Service Commission, the entrance requirement for accredited veterinary colleges has been raised to four years high school education of at least 14 units, or their equivalent, for all accredited veterinary colleges, effective for the fall of 1920.

DEPARTMENT OF

BOVINE PRACTICE

Edited by JOHN FRANCIS DE VINE, D. V. S.

Treatment of Endometritis

In discussing endometritis we gave our opinion as to the impracticability of diagnosing clinically simple, acute endometritis and also pointed out in a case of acute endometritis requiring treatment, we usually have also occasion to treat a cotyledonitis and not infrequently a placentitis. Fortunately, however, for the practitioner, the treatment of these conditions are practically the same since they are only varied degrees of infection and the principal variation of treatment will be the duration of the period in which a skilled veterinarian must give daily attention; consequently, we will discuss the treatment of endometritis, cotyledonitis, placentitis and retained placenta, under one heading, outlining the treatment for the most severe cases, which are almost always the ones in which the placenta is retained.

When a placenta is retained it is an indication that there must be more or less unnatural adhesions between the fetal membranes and the internal surface of the uterus. It has been the custom for years for both empirics and trained veterinarians when called to attend these cases, to remove all or part of the membranes by manipulations, commonly spoken of as "unbuttoning." The rugged grade cow with a hardy constitution even under the roughest handling usually withstood this ordeal, often never missing a feed or decreasing very much in her milk flow. Even some purebreds withstood this crude handling pretty well until the organic changes caused by the seemingly increased virulence of microbic invasion became so severe as to apparently heighten the susceptibility of infection and absorption in our purebreds.

First, let me say that we should *never* use force to remove a placenta from the uterus of a purebred or delicate high grade cow. It is true that occasionally we are called to see an animal with a retained placenta where adhesions are very slight, with only a pinching of the membranes at the extreme end of the cornua or slight adhesions of a few of the cotyledons, which is soon released by very little manipulation and the animal is thereby relieved practically as normally as though the membranes had been discharged without aid; but where the adhesions are more extensive it is my judgment after twenty years' experience that the man who will persist in the old method of "taking them away" will come to grief sooner or later. It matters not how skilled a man may be, puerperal septicemia with all its dangers is sure to overtake some of his patients. The method of removing a placenta and cleansing a uterus that I prefer, is douching of the membranes with a warm physiological salt solution, except where a putrid condition exists, (in the latter case I may use a mild antiseptic for one or two douchings, rinsing the uterus with the salt solution after) until every shred has been washed away. Some membranes should be allowed to hang through the os as this will retard its contraction and it is well to loosen all membranes if possible before the os contracts so much as to prevent the introduction of the hand. It is almost superfluous to add that the membranes should not be allowed to hang out of the vagnia thereby keeping the tail and hind parts soiled and also answering as a bridge inviting organisms into the uterus, but should be cut off so that they simply hang through the os, and common decency demands that the tail, hind quarters and ud-

der be kept clean so as to avoid contamination of the milk and the internal structure of the udder.

We will find that after two or three days of douching, the capillaries of the cotyledons and the endometrium contract and assume more firmness, thereby lessening the danger of re-absorption, and the adhesions between the membranes and the cotyledons gradually give way so that by gentle manipulation they can usually be removed completely with safety in from three to seven days. By this method we will find that at no time will we have the foul smelling sanguino-purulent uterine content that we do have when the membranes are neglected; neither will we have the soft, friable, decomposing uterus that is so dangerous to touch and that so aften leads on to metroperitonitis and death.

With rare exceptions there is no true growing together of the maternal membranes and the fetal cotyledons; it is simply a resultant swelling from the inflammatory condition that dovetails them, so to speak, so tightly that the tufts of the chorion are held firmly to the maternal cotyledons. This being so, with our present knowledge of surgery and asepsis, would not hot douching to soothe, cleanse and loosen these membranes be a reasonable thing to do?

I appreciate that in douching a uterus where the membranes are still adherent we are not douching the utero-chorionic space over its entire surface, but our hot solution is coming in contact with the inner surfact of the membranes and also the inner surface of the uterus where there has been the greatest amount of infection and where there is the greatest amount of endometritis; namely, that portion near the cervix where necrosis has so often completed the separation of the chorion from the cotyledons and as all experienced workers know, *we are literally cleansing the parts that need it most,* since it is quite the custom of all practical men in beginning to douche a uterus, to roll up the loosened shreds into a rope to avoid their interference with the douching and syphoning out, and in this way the hot solution flows behind the loosened membranes and comes in contact with the inflamed endometrium. There are certain things to be taken into account if the douching of a uterus is to accomplish the desired results; and again there are certain uteri that should not be douched, and every veterinarian should know this before he attempts this character of work.

First, there is no excuse for douching a uterus immediately after parturition unless it has become in some way seriously infected by maniulation or a decaying fetus. Time should be given for the uterus to do its share as far as it can, by its germicidal secretions.

Second, a ruptured uterus obviously should not be douched. There is usually no excuse for this careless act, nevertheless it is sometimes done. We should first carefully clean the external genitals and make a cautious examination of the uterus before beginning treatment or the handling of it. This is not only so in douching but also in cases of dystocia.

Let me remind you that there are more uteri ruptured where parturition is obstructed, by the labor efforts of the cow, where by force of the diaphragm and abdominal muscles the fetus is jammed in the bony cavity and membranes ruptured, allowing the fluid to escape, thus exposing the extremities of the fetus directly against the internal surface of the uterus at a time when it is greatly distended and in the throes of labor, than are ruptured by capable veterinarians in handling dystocia. Even with the fetus in the uterus, ruptures can usually be located if a proper careful examination is made, since at least 90 per cent of all ruptures are either in the fundus or in the superior part of the gravid horn. This is quite obvious when we consider as we have said that these are the parts that some in contact with the bony cavity and are forced upward and backward by the softer organs. Naturally there is nothing to interfere with a careful examination after the fetus has been delivered and we are treating the membranes only, and this examination should be made before we douche the animal, and not after. True, the greater the detention naturally the thinner are the walls, but any one with obstetrical experience knows that the uterus is rather a strong organ and will stand considerable handling in removing the fetus, or in replacing an everted uterus; it is naturally stronger 24 hours after when the walls have contracted and thickened somewhat, and for an intelligent operator to rupture such a uterus,

which has withstood the natural labor forces, with his hand, a soft rubber hose and water, seems beyond reason.

Third, there is still another condition under which we are not justified in douching the uterus, and that is when we are called to see an animal that has freshened several days before, where the membranes have undergone decomposition, or where the membranes have been forcibly removed, thereby leaving a raw surface allowing absorption of the putrid uterine content; in either case we are apt to have a resultant metritis or metro-peritonitis, accompanied with decomposed uterine walls that have no more strength than paper. If we examine such a uterus we will find the walls almost as putrid as the content. They are lifeless, slimy or friable and decomposing, in such a condition that the weight of one's finger almost penetrates. I should like to ask what percentage of such cases live with or without douching. The first day or two but little can be done through the rectum to aid the douching or syphoning; as a matter of fact this is fortunate as the less the cow is irritated the better she is off. It would be well if we could forget, so to speak, the retained placenta, and let it take care of itself, for a day or two. *The one thought should be to cleanse the uterus of all exudate and debris thoroughly, but as gently as possible.* Supervise the feeding of the cow, see that she has laxative food and succulence if possible. If she is not vigorous in every way, stimulate her all she will stand with such drugs as alcohol, nux vomica and capsicum.

As the inflammation of the uterus begins to subside, the uterus will begin to involute so that after a few days the cornuii can be grasped with the hand through the bowel and as the irrigating solution is pumped in with force, it may be gently massaged to all parts of the uterus and squeezed out again which seems to materially tone rather than harm the uterus.

This method of irrigation of the uterus proper may be continued as long as the os is sufficiently dilated to admit the hose or catheter. There is just one danger in douching a uterus of this character that to caution one with veterinary training to guard against seems little short of ludicrous, and that is if the cervix is so contracted that the tube fills its entire lumen leaving no space for the return of the fluid from the uterus as it is pumped in and one does not stop pumping when it is filled and press out the fluid, but rather keeps on pumping, it is entirely within reason that one might accomplish what one is apparently bent on, that is rupturing rathering than cleansing the uterus.

Another thing that cannot be repeated too often or emphasized too strongly, *is that a uterus should be douched only while it still has life and tone.* Douching then will not only cleanse but also stimulate it to early recovery and when infection is severe this cleansing should not be delayed any longer than 36 hours after calving. Twenty-four hours is better.

After a uterus has lost tone and begun to degenerate it is best to leave it alone, and devote all attention to improving the physical resistance of the animal.

Thorough cleansing of a recently gravid uterus cannot be accomplished with a few quarts of lukewarm water. The water should be as hot as one can work in comfortably with the bare hands and may require ten or fifteen gallons to be carried by a hose in the hand as far as one can reach, and *never under any circumstance* is the hose to be released from the cover of the hand. This douching can be done daily or twice daily, until the uterus is absolutely clean so far as is perceptible by the appearance of the fluid returned without in the least disturbing or irritating the most delicate cow, providing due care is taken.

We occasionally meet an animal with such an acute cervicitis that when the cervix is touched she gives evidence of severe pain, followed by violent straining. After douching such animals, it has been my custom for years, to dry the cervix with cotton, swab it with tincture of iodin and inject into the uterus and vagina a quart of warm olive oil to which has been added two ounces of tincture of opium. This is to be repeated after each douching as often as necessary. There may be better ways of handling these cases, but this method has served me well.

A rather crude but practical barometer as to when we may discontinue douching the uterus proper, is when it is cleansed of all debris and a thick catarrhal exudate

(*Continued on Page* 604)

DEPARTMENT OF

SWINE PRACTICE

Edited by A. T. KINSLEY, M. Sc., D. V. S.

Hairless Pigs

Many hog breeders in the northern portion of the United States and Canada have extensive losses in their spring pig crop, from a condition ordinarily termed hairless pigs. This condition is not abortion, the pigs being fully developed at the time of farrowing, but have some abnormalities, the one most notable being the absence of hair.

According to a bulletin issued by the University of Montana, the loss in pigs annually in that state alone, is estimated at about 100,000. Other states have similar losses but probably not as extensive as occurs in Montana. From evidences at hand, it appears that in certain sections of Montana this condition is much more prevalent than in other portions of the state. The drainage basin of the Yellowstone the lower Missouri, the Musselshell with some of their tributaries are the areas in which the losses are most extensive in Montana.

Ranchmen have found, by experience, that in some instances it is possible to move their brood sows a mile or two from their regular hog lots and produce normal, healthy pigs. In some instances, one ranch or several ranches in a community have no losses from this trouble, while all the surrounding ranches have extensive losses. It has also been found that, as a rule, only a portion of the sows in a given breeding pen will produce hairless pigs and, in some instances, ninety-five per cent of the pigs farrowed in the spring will be hairless and the same sows will produce practically one hundred per cent of normal pigs in the fall.

According to the reports from Montana, hairless pigs may be produced when the sows are kept in pens or when running at large, when fed on any combination of grain, hay, roots, etc., and whether fed alfalfa or not. In other words, experience of the Montana breeders is that hairless pigs will be produced regardless of any variation in feed, care or management.

On the other hand, experiments with feeders and breeders in the state of Wisconsin, indicate that sows fed on a ration of various grains and with twenty-five per cent of alfalfa added in the ration, have overcome this trouble. They have also found that when young stock are fed on concentrates, such as grains and skimmed milk and little or no roughage, hairless pigs often result.

According to all investigators up to the present time, the primary cause of hairlessness in pigs is goiter. Goiter is a condition in which the thyroid glands are affected. The hairless pig has rather a typical appearance when farrowed. The pig is usually about normal size and there may be a total absence of hair or diminished amount of hair. On a closer inspection it will be noted that the neck and head are apparently larger and the skin from the shoulders forward is thicker than normal and has a wrinkled appearance. The hoofs will also be found to be thin and much less durable than in normal pigs.

If such a pig is carefully autopsied, the thyroid glands will be easily located and it will be noted that they are enlarged. What it is that causes the goiter to develop in the unborn pig has not been positively determined, but it is the supposition that there is a deficiency of some of the essential elements in the food. The proper ingredient that is absent or occurs in insufficient quantity in the food causing this trouble is iodin.

The experiment station in Montana has carefully examined the thyroid glands of many hairless pigs and they have found that although the glands are practically always enlarged, the iodin content of the gland is very low and that the degree of hairlessness varies with the iodin content. To overcome this condition, the various experiment stations by experiments arrived at the conclusion that the losses from hairless pigs may be diminished to a minimum by giving the proper ration in which it seems advisable not to feed the breeding sows on a concentrated ration containing a high percentage of protein, but rather to give a ration in which about twenty-five per cent of the food is bulk material and probably preferably alfalfa.

In addition to this, iodin may be given in the

food. The amount required has not been determined. The form of iodin usually administered is potassium iodid and since the malady varies in different localities, we believe it would be advisable for veterinarians in communities, where this condition exists, to make a careful study of the food problem, sanitary surroundings and from these sources obtain some ideas relative to the iodin requirements, in order that the proper dosage for breeding sows may be determined.

FORAGE POISONING IN HOGS

A herd of 200 hogs was vaccinated September 26th. The hogs were healthy and were turned in forty acres of corn and forty acres of clover, all in good condition. Since October 7th to 9th, six head have died with symptoms as follows: No temperature and they ate until they showed stiffness. They would stand in one place with noses on the ground, with fore and hind legs together under the body, backs arched, and knuckled over on their knees. If startled, they would stagger and fall, some could regain their feet with difficulty and some could not. These hogs lived from four to eight hours after symptoms were evidenced. The history I obtained from the owner. I did not see the hogs showing symptoms. All of them are now in good condition. I suspected forage poisoning but could not find any weed that I thought would poison them.—R. E. O.

REPLY: From the history and description of the condition, it is apparent that the hogs were not affected with any ordinary infectious disease as they showed no rise of temperature, and in practically all infectious diseases there is a temperature disturbance. The attitude assumed by the swine is indicative of cerebral disturbance. Cerebral disturbances are commonly associated with mycotic poisoning, and from previous investigations, we are of the opinion that the hogs in question died of some type of forage poisoning.

ASCARID INFESTATION SUSPECTED

There is a condition existing in hogs here that is making me uneasy. It acts like swine plague and looks like swine plague, but still there are lesions and symptoms that I have never seen before. One of my clients has about 70 pure bred Poland China April and May pigs. They developed a cough the later part of June but nothing alarming. On July 6th they were immunized for cholera, simultaneous method, and with mixed infection bacterin. This did not seem to increase nor diminish the cough. About the latter part of August, among twenty boars in one pen, the cough became severe, and a number developed thumps or a peculiar movement of the flanks, but their appetite remained fairly good Some recovered and others dragged along, one day their clinical appearance being good, and the next day they would lie down most of the time, gradually becoming emaciated, but even on their last pins, they still ate some or came out to feed. A number of sows farrowed about this time, and the pigs when about a week old developed a cough, thumping and gradually becoming thinner. Six of the older pigs were given mixed infection bacterin on September 20th, and on September 24th they received a second treatment. I saw them again on September 27th, and as far as clinical appearance indicated, they were about the same. The temperature was seldom over 105° F., usually normal, sometimes 104° F., and at times below normal. Autopsy showed many of the small pigs, one to eight weeks old, with buttons or circumscribed elevations on the skin. The lungs were in various stages of pneumonia in all of them. The lymph glands were swollen and congested and the intestines inflamed and congested but not in all of them. The liver was apparently normal. There were petechial hemorrhages of a guinea egg type in one only. Petechial hemorrhages were found on the serous membranes in a few cases. The old sows had a mild attack lasting from one to four days, but in the spring and fall pigs the affection seemed to linger.—C. F. B.

REPLY: From your description, I am of the opinion that you are dealing with a herd of swine affected with the larval form of the Ascaris suum. You probably will recall the life cycle of this parasite, which consists primarily of the residence of the adult in the small intestine of swine, where it produces ova which passing out with fecal matter contaminate all grounds, pastures and feed lots in which such hogs are permitted to run. Outside of the animal body, the ova develop into embryos which may remain encysted on foreign matter for a variable length of time depending upon outside conditions. When these embryos are ingested, the digestive fluids appear to dissolve their enveloping membrane, and some of them pass through the digestive tube and gain entrance to the blood vessels. A number of those which gain access to the blood vessels are finally deposited in the lungs, where they develop into the larval stage and where also they produce an embolic pneumonia. This is probably the type of pneumonia which the pigs in question were affected with, and the relief of this condition is problematic. The better plan is to develop a preventive system, which apparently would consist of a thorough removal of the intestinal roundworms in the adult swine. This should be done efficiently in sows just before farrowing and their pens and premises should be rid of any waste material that is likely to be contaminated with fecal matter. The other lesions mentioned are probably incidental to the pulmonary parasitism. Inhalation medica-

tion may be attempted, using for the medicament, oil of eucalyptus, turpentine or any of the volatile agents of this class.

SOW DIES FOLLOWING GIVING OF PHYSIC BALL.

I was called to see a sow that had given birth to ten pigs about four days previous and was off her feed, etc. Upon examination, I diagnosed it as stoppage and gave a physic ball with a balling gun. Immediately after giving the ball, the sow had difficulty in breathing, appearing to be choked or as if there was a paralysis of the throat. Thinking that perhaps the ball had gone down the larynx into the windpipe, I made an examination by running my hand in the mouth down to the larynx but found nothing. I looked in the mouth but could not see anything in the throat. The sow died in about ten minutes with no easing up of the breathing. Post-mortem examination showed nothing unusual so far as I could tell except a little bloody mucus in the mouth. The physic ball had gone into the stomach, and there was no rupture of any kind. The sow did not bloat or discharge at the nose or mouth as in ordinary choke. About five minutes after receiving the ball, she retched once as if trying to vomit. I have given physic balls to pigs with the balling gun many times, to pigs from 100 pounds in weight up (this one weighed about 400 pounds), without any bad results, and I am at a loss to account for this case.—C. M. M.

REPLY: It is very probable that there was an autointoxication which possibly produced a condition similar to post-partum paresis, and death was near when the ball was administered. The exertion due to the administration of the ball was sufficient to terminate the life of the animal. A similar case has been observed in a sow in which a diagnosis had been made of quinsy, and after some manipulation of the animal for the purpose of making an examination, the sow died. She was previously in good condition except there was difficult breathing. Such cases should be handled very carefully, and if there is marked difficulty in breathing, it is doubtful if the animal should be disturbed to give oral medication. Hypodermic or intravenous injections would be far better and safer, particularly if they can be applied without disturbing the animal.

One of the two silver fox farms in Oregon is owned by Dr. D. C. McNabb, who operates a fully equipped farm at 2214 East Court street, Pendleton, Ore. He started the farm a year ago and now has a total of 17 foxes, some of which he values at $10,000 each. He states that the climate in that section is ideal for the raising of foxes, the cold winters being an advantage in causing heavy fur.

TREATMENT OF ENDOMETRITIS

(*Continued from Page* 601)

appears. From then on we should devote our attention to douching the cervix and keeping the vagina clean. It is my custom to leave this part of the work practically entirely to the owner or herdsman. Some veterinarians seem to object to this method. All I can say is that I have done this for close on twenty years and still think well of it.

The vagina is to be douched daily with a hot solution until all discharges cease. The veterinarian should make an examination about once a week to determine progress and give any necessary attention or instructions. If there are vaginal complications a mild solution of permanganate seems to hasten recovery. If the discharge is entirely cleaned up and all parts feel normal to the touch, the animal is put back in the herd at the end of six or seven weeks. This seems safe since Schroeder and Cotton state they have never found the Bang organism in the uterus or vagnia later than fifty-one days after abortion. However, if the cow is slow in cleaning up it is well to continue her in quarantine for at least three months, since in the report of the New York State Veterinary College of 1912-13, on page 89, it is stated that the Bang organism was found in the uterus of a cow eight and a half weeks after abortion. I continue the douching of the vagina and cervix for two reasons:

First, I have a fear that abortion is not solely due to the Bang organism and that the vagnia harbors organisms that await an opportunity to enter the uterus.

Second, I believe that cervicitis is one of the most obstinate and most frequent causes of sterility and that constant hot douching is one of the best methods of guarding against acute cervicitis becoming chronic.

In addition to this technic it is my custom to douche the vagnia of all cows in the herd two or three times weekly for two or three weeks before they are bred and every other day after they are bred, until we are certain they have conceived, all cows to be douched again within a week or ten days of freshening in the hope of again cleansing the vagnia at a time the uterus is wide open and exposed.

Department of Live Stock Poisoning

By L. H. PAMMEL, Ph. D., Ames, Iowa
Professor of Botany, Iowa State College

Readers are urged to take advantage of the opportunity offered by Dr. Pammel, for the identification of specimens of supposedly poisonous plants. Two good-sized specimens, carefully packed, should be sent to him direct, with such history as may be available. Simply mention that you are a reader of the AMERICAN JOURNAL OF VETERINARY MEDICINE and no charge will be made for this service.

Poisoning From Silage and Moulds

Last spring I received the following interesting letter from Dr. M. Nelson of Sigourney, Iowa in regard to injurious silage.

"I am mailing you under separate cover, a sample of ensilage and would greatly appreciate it if you will examine the same and state whether or not it contains fungi poisonous to stock (cattle).

"I have a client who has lost several head. Some seem to have a chronic form, lingering from ten days to two weeks, while yesterday he lost two very suddenly.

"There were no characteristic lesions of hemorrhagic septicemia, no lead or other poisonous substances of any kind. The cattle have access to clover hay, which, while a little dusty, is what I would call very good quality.

"The most pronounced symptoms observed were parenchymatous hemorrhagic nephritis and a degeneration of the mucous membrane of the stomach and intestines, the membrane being loose and peeling off easily. All other organs were apparently normal.

"Will you kindly state your findings and also give any advice you can regarding the feeding of the ensilage if poisonous "fungi are found?"

The following recent letter from a doctor in Ada, Oklahoma will be of interest in regard to injurious fungi.

"Having been a reader of your writings on live stock poisoning in the American Journal of Veterinary Medicine, for some time, I would like to ask you for some information. What I want is a work on plant poisoning, with illustrations, the treatment of the same, or antidotes. I would like very much to get a treatise on hay or forage poisoning. We have for the past five years quite a good deal of oak poisoning in the early spring, but I have at the expense of the stock raisers finally been able to control it. We have here, in the fall months, what is commonly called "blind staggers," which is nothing more than forage poisoning by fungi. I certainly would be very glad to get a line on this, something that is worth while."

The writer examined the mouldy silage from Dr. Nelson and found considerabie purple mould (*Monascus purpureus*), green mould (*Penicillium glaucum* and *Aspergillus glaucus*) and a white mould *Fusarium*.

Certain fungi like *Aspergilla fumigatus*, A. *malignum*, A. *flavus*, *Fusarium equinum*, *Mucor corymbifer*, *mucor rhizopodiformis* and many other fungi are pathogenic. There are many other fungi which produce toxic substances and it is with these we have to deal in connection with the poorly defined trouble known as "blind staggers," etc. The subject needs to be worked up carefully in light of the interesting work done by Dr. Blakeslee in connection with one of the common moulds (*Mucor stolonifer*) which was powerfully toxic when injected into the animal. The above is cited as a case applicable to what is generally the case in the region mentioned by Dr. Young. I am not so sure that all cases of so-called "blind staggers" are referable to poison from fungi. Fungi have been suspected of causing trouble in live stock in various countries. In Russia and Siberia where rye is frequently attacked by a species of Fusaruim, a disease occurs that resembles the poisoning produced from mouldy hay and grain in this country.

Attention should be called to the interesting work of Dr. Graham in connection with certain bacteria found in spoiled forage which causes a serious toxic condition. It may be that Dr. Graham has more nearly solved the problem than any other investigator. I gave an extended review of this paper in the AMERICAN JOURNAL OF VETERINARY MEDICINE, July, 1919.

It would seem that under no condition should this mouldy hay, corn, etc., be consumed as food for animals. In either event products of bacteria and fungi are highly toxic and should be avoided.

I am going to give the result of some work done a few years ago by Drs. Butler and Mayo. Dr. Butler and Dr. Mayo conducted an experiment with some mouldy corn from a farmer who lost four registered Percheron horses at Wakefield, Kansas. Four hundred pounds of the worst of this corn and fifty pounds of the chaff and screenings were sent to the Agricultural College of Kansas, and a feeding experi-

ment was started with two colts, twenty-three months old. The experiment began on July 16th, when each colt received 1½ kilos twice daily. On July 22nd they were fed 1½ kilos of corn and cob meal twice daily. On the 26th of July, 1¾ kilos of the damaged corn, well ground, cob and all. This was continued until August 19th. One colt died August 21st. Another experiment was conducted with a two-year old colt, but fed with mouldy corn and good prairie hay. The temperature of the animal varied from 101° to 112° F. This colt died on July 26th, the feeding experiment having begun on June 30th. It was observed that after three weeks there were no notable changes except a gain in flesh.

INJURIES FROM WILD BARLEY IN CALIFORNIA.

In conversation with one of my students from California, Mr. D. M. Smith, the other day, he spoke about the great injury that the wild barley (*Hordeum murinum*) of that state does to live stock. Since the plant is also common in other western sections of the country the account will prove of interest. Mr. Smith says, "*Hordeum murinum* squirrel grass, foxtail or barley grass as it is often called, is a very well known weed in the state of California, especially in the San Joaquin Valley in the central part of the state."

"It comes up late in the fall or more accurately when the heavy rains start. This usually occurs in the latter part of November or the first part of December. The grass comes up very thick and is found everywhere along the road, in alfalfa fields, on cultivated fields and broken ground to some extent. The livestock seem accustomed to the grass as a forage crop and it constitutes a large part of the pasture during the winter. Dairy cows produce a good quantity of milk when pastured on this grass; horses like it, as do hogs also.

"When the grass is not cut before it reaches maturity, or where it has been left uncut, a great deal of injury and suffering to livestock results."

Mr. Smith suggests that "the first cutting of alfalfa be cut early so that the foxtail or squirrel grass is cut before the heads start to harden. Where it is possible to do this, a great deal of trouble later is avoided. The alfalfa and squirrel grass thus cut are stacked slightly green and salt is sprinkled over each layer of hay during stacking. This causes the hay to go through a slight ensilage process in the stack which turns the hay brown, gives it a peculiarly pungent odor and makes it a very palatable forage.

"Animals on pasture or stock receiving hay in which there is a precentage of matured foxtail heads, suffer considerably. While in California I had the misfortune to have to feed a large amount of hay, that was badly infested with foxtail. I had to make it a practice to go through the dairy herd at least once a day and remove seeds from the eyes of cows and great bunches of seed sticking between the teeth and along the gums. A number of cows were blind in one eye as a result of this grass seed.

"Although we were especially careful not to give any hay so infested to cows it was impossible to keep it away from them altogether and we had the same difficulty in keeping the mouth and eyes free from the seed.

"Hogs on pasture suffered more than any other class of stock, as they were just about the right height to have the seed stick to their bodies. A number of pigs lost their eyesight in one eye and in some cases both. I have seen pigs die, apparently crazy, only to cut them open and find that a foxtail seed had made its way to the brain through the ear. I have seen others with great swellings in the belly from foxtail seeds.

"I believe that if the mature heads could be kept away from the livestock the grass would be valuable though of course it would be of no value in this state, as we have many other forage crops."

This troublesome weed has not made its appearance, to my knowledge, in Iowa. Should it do so more trouble may be expected than from our common wild barley (*Hordeum jubatum*).

GROUND CHERRY LEAVES SUPPOSED TO BE POISONOUS.

Mr. A. D. Noble of Humboldt, Iowa sent a specimen of the ground cherry (*Physalis longifolia*) with the following letter:

"I am sending you a weed which we think may be killing some of our sheep in this county. Will you kindly tell me if it is poisonous, or do you think it would be some other weed? The veterinarian says it is poison of some kind."

The ground cherry belongs to the same family as the black nightshade, black henbane, Jimson weed, potato, buffalo bur and many other plants, containing medicinal and poisonous substances. Of course, the ripe fruit of the tomato, the tuber of the potato, the ripe fruit of some of the ground cherries are commonly used for food and are excellent. However, the green fruit and leaves of all of these plants are more or less injurious, and all contain the substance solanin which is poisonous.

Dr. Harry J. Janson, 46, died September 21st at his home in Cincinnati, Ohio, as the result of a fractured skull which he suffered when his automobile collided with another machine, September 12th.

POINTED OPINIONS ON LIVE TOPICS by Readers of Veterinary Medicine

It is in reports like those of this department that the current history of the progress of veterinary science is written. Are you leaving a record of your experience which will help others, as you have been aided by these and other clinical reports? If not, you are earnestly invited to contribute from your experience that this department may be of the greatest service to its readers. By so doing you will earn the lasting gratitude of those who are aided by your suggestions.

Pointers Gleaned From My Practice

In hog cholera vaccination, I have been charging two cents per mil or c. c. on lots of 100 or more; for smaller bunches I charge more, depending on the size and number.

In diagnosing necrobacillosis of hogs, I have found that the pigs eat heartily although losing flesh each day; their hair is dry and stands up and they look dirty. Autopsy shows the lumen of the intestines covered with mucus, under which the mucous membrane is pink, ulcerated or necrotic. My treatment is to segregate the infected pigs and furnish fresh pasture and sleeping quarters for the thrifty looking ones if possible. Medicinally I prescribe a powder which I get from Jensen-Salsbery composed of copper arsenite, copper sulphate, hyposulphite of soda, sodium chlorid and charcoal. The results are quite favorable when directions can be followed.

For scours in calves, I use sulphocarbolate tablets (Abbott) in boiled milk. I use three tablets to a quart of boiled milk, and recommend that the calf be taken from the mother and fed nothing but boiled milk three or four times a day until cured, which generally takes three or four days. I also use the same treatment for colts but do not take them from the mother. My success with this treatment is so good that I am not looking for anything better.

Blackleg aggressin has proved 100 per cent efficient with me.

A fifteen per cent solution of argyrol will relieve pinkeye in cattle better than anything I have used, but its administration to a large number of wild cattle is a task I would not care for. I put a few drops in the eye two or three times a day.

For retained placenta in cows, I wash the vulva, tail, etc., thoroughly with soap and water, remove all I can of the placenta, break an eikos capsule and smear a handful in each horn of the uterus. With this treatment 95 per cent get along as nicely as if nature had done the job.

For impaction of the rumen, I use nothing but nux vomica and Epsom salt with good results.

Vaccination with hemorrhagic septicemia vaccine stops losses from cornstalk disease in my territory.

I have found in eversion of the uterus in cows that merely replacing the organ does not complete the operation. To obtain the best results, I wash the uterus, tail, etc., with permanganate solution, seven grains to a gallon of water, replace the organ gently if possible, straighten out the horns and gently massage them internally until the uterus contracts, which usually occurs in a few minutes. I then suture the vulva with a heavy cord or several small ones doubled, to prevent a relapse should the cow strain or lie down. With this procedure, a cow will hardly ever strain. However, I had one case that would not desist until we tied her up with a log chain.

In trephining for the repulsion of molars, I have had good results with all I have operated on so far. I do not cast the animal, using simply a twitch and find that most cases do not fight. I use only potassium permanganate to irrigate the sinus, ten grains to a gallon of water, twice daily.

My treatment for infectious ophthalmia in horses is argyrol 15 per cent, two or three times daily in the first stages; atropin sulphate, three grains in an ounce of water once a day; and a fly blister in the hollow above the eye every other day, only a small amount being rubbed in with the end of the finger. The atropin and blister help to clear the eye.

The forerunner of navel ill or swollen joints in colts, I believe, is as we sometimes call it, a leaky navel. The treatment is to warn the client that if he wants his colts treated successfully for this ailment, he should watch the

navel and call you at the first hint of a leak, although a majority of the cases can be cured after they have gone several days if the joints are not swollen. I cast the colt, wash the navel and surrounding surface thoroughly with soap and water, clip all long hairs around the opening, then insert a small syringe into the urachus gently until it enters the bladder, draw it back until I think the end is near the opening in the bladder, and inject a small amount of oil of turpentine, about one-half dram. The colt is immediately released and the owner told that it will be uneasy for a short while. One treatment generally gives the desired results. If there is still a leak on the third day, I repeat the treatment. I treat quite a number each year and very seldom lose a case. The way I have it figured out is this. For some reason the opening from the bladder to the urachus does not close at birth as nature meant it to do, or something causes it to open again. The urine causes necrosis of the urachus letting the urine into the peritoneal cavity, which quickly causes uremic poisoning, when it is too late for treatment. The turpentine (some other drug might be better) causes the bladder to swell closing the opening and Mother Nature does the rest. Try this treatment, and if you have the same condition to deal with that I have here, I am sure you will be satisfied with the results.

Manilla, Iowa. C. L. WILHITE.

SAND IMPACTION IN HORSES

Many conflicting descriptions of sick horses had been presented to me by ranchers from an outlying foothill and mountain district in this vicinity. The majority of the horses affected had died two and three days after the symptoms appeared. One stockman pronounced it the effect of loco or rattle weed, another, blind staggers, and so on down the line of diseases diagnosed by the average layman.

The affection appeared at the time of the year when the dry feed had been closely eaten and the seeds of various plants dropped to the ground. Symptoms appeared suddenly, the animal showing a typical febrile picture, great abdominal distress and a staggering gait with apparent blindness, walking into objects and through fences. In about twenty-four hours the animal would be down, unable to get up, kicking and straining. The clinical picture showed the visible membranes highly injected, nostrils widely dilated with irregular respiration, pulse fast and full, breathing labored, peristalsis intermittent, temperature 105 to 106° F. Rectal examinations in some cases revealed sand mixed with the feces and the rectum clinging to the arm.

As to treatment, I have had only a few opportunities to administer any, and saved two horses on which cases I was called at the onset of symptoms. I have resorted to two methods of treatment. The one which seemed to have given the best success consisted of the administration of large and frequent doses of raw linseed oil with which I gave two ounces of aromatic spirits of ammonia and three ounces of salicylic acid—at the first a two-quart dose of the oil. If peristalsis was almost nil I gave possibly one-eighth grain of arecolin for stimulation every half hour until the desired result was accomplished, also high enemas of cold water, and when the animal was down, it was rolled upon its back and held in that position for a few minutes with the hope of helping gravitate the sand in its course toward the rectum. I believe this last operation helped considerably as I have noted two quarts of nothing but sand evacuated at that time. About every thirty minutes I caused the horses to be forced in this position and at nearly every repetition, some expulsion was noticed.

In case of recovery, after treatment included demulcent drinks, with sulphocarbolates and a diet of bran mashes with milk and eggs for a few days.

Autopsies which I conducted revealed an empty stomach in nearly all cases; the intestinal mucosa congested and covered with a mucopurulent exudate and in places sloughing shreds of the mucosa, extravasation of blood in patches, and at the location of the sand pack a highly congested condition prevailed, almost gangrenous. In some cases peritonitis was present to a marked degree.

I have heard of a great many other cases in the same community and the cause is in my opinion due to the fact that feed being scarce, the horses in gathering Filari seeds, of which they are very fond, from the ground, ingest quantities of sand.

Delano, Cal. D. R. COOK.

PARALYSIS DUE TO CALVING

The treatment I have found most successful in this trouble is saline laxatives, nux vomica, or the preparation of iron, arsenic and strychnin which is now sold by most pharmaceutical houses. It is advisable to turn the animal over three or four times daily and massage the legs and pelvic region. Feed freely as long as bowels are moving properly. Have not found it a good successful practice to try and raise a cow, although after they are down a day or so, the farmer invariable wishes to "sling her up." With a good bed of straw and the above treatment, I think good results can be looked for. Have had one cow, the past winter, that was down two months and finally decided to live and got up. If you try raising them in slings, you will use up a lot of strength you need for night calls and they will get up ordinarily of their own accord sooner or later.

Perry, N. Y. FRED C. CLARK.

BRAIN DISORDER IN A MARE

I was called to see a large Percheron mare, eight years old, and in good condition. The following condition was found on arrival at the farm. The mare was standing in a straight stall with her head pressed in the corner. She had been in a pasture all summer. Pulse 70; breathing, very fast; temperature 102.2° F.; and sweating profusely. I tried several times to back her from the stall, but it was impossible to back her an inch. She would press against the barn with her head, as though trying to push the building over. She fell down twice while I was there, but got up with a little help. By pulling her head up to a window in the front part of the stall, I managed to give her a cathartic ball, but it excited her so that I did not try further medication by the mouth. Muscles were rigid, so gave lobelin sulphate hypodermically. I left a sedative mixture with the owner, with instructions to give if the mare became too uneasy.

I called the next day and the mare was apparently well. This is one of those cases we all have "if we will admit it," where we are not just sure what was the trouble, and do not know whether we deserve credit for the cure, or whether our helper, Nature, did it alone. This case was apparently a nervous and brain disorder, resembling hydrocephalus, but ended in a recovery rather quickly. Would be glad of any one's opinion as to diagnosis and treatment.

Perry, N. Y. FRED C. CLARK.

NECROSIS OF THE LARYNX

In July of this year, I was called to see a six-weeks-old calf that the owner said had difficulty in getting its breath. The calf seemed to be normal in every way except for the marked dyspnea. There was no abrasion or external lesion of any kind. I applied a counterirritant on the region of the larynx and said I would call the next evening. At that time the respiration was so impaired that the breathing could be heard some distance from the barn.

I performed tracheotomy, which gave instant relief. The next morning the patient seemed much improved and nursed its mother, but the day following the owner called me up and said the calf was dead.

I held an autopsy and found the larynx to be a necrotic mass. The process seemed to have originated in the cricoid cartilage, but just what variety of bacilli were present, how they gained entrance and what the predisposing cause was, I am not prepared to say.

Winfield, W. Va. REMBRANDT MORGAN.

DETERMINING THE AGE OF CATTLE BY THE TEETH*

The age of cattle can be approximated closely by the appearance, development, and subsequent wear of their second incisor teeth. Cattle have eight incisor teeth, all in the lower jaw. In the calf at birth two or more of the temporary or first incisor teeth are present. With the first month the entire eight incisors have appeared.

Fig. 1. Internal face of incisors of the calf.

Fig. 2. Internal face of incisors at 2 years.

As the animal approaches 2 years of age the center pair of temporary incisor teeth or pinchers are replaced by the perament pinchers which at 2 years attain full development.

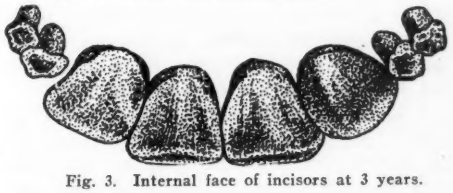


Fig. 3. Internal face of incisors at 3 years.

At from 2½ to 3 years the permanent first intermediates are cut and are usually fully developed at 3 years.

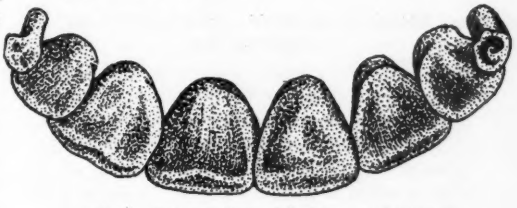


Fig. 4. Internal face of incisors at 4 years.

At 3½ years the second intermediates or laterals are cut. They are on a level with the first intermediates and begin to wear at 4 years.

*By George W. Pope, Quarantine Division, Bureau of Animal Industry, Dept. of Agriculture, Washington, D. C. Bulletin 1066.

At 4½ to 5 years the corner teeth are replaced, the animal at 5 years having the full complement of incisors with the corners fully developed.

Fig. 5. Internal face of incisors at 5 years.

At 5 to 6 years there is a leveling of the permanent pinchers, the pinchers usually being leveled at six and both pairs of intermediates partially leveled and the corner incisors showing wear.

Fig. 6. Internal face of incisors at 12 years.

From seven to eight the pinchers are noticeably worn; from eight to nine the middle pairs, and by ten years the corner teeth.

After 6 years the arch gradually loses its rounded contour and becomes nearly straight by the twelfth year. In the meantime the teeth have gradually become triangular in shape, distinctly separated, and show the progressive wearing to stubs.

ARECOLIN NOT INDICATED IN METRITIS

I note in the October issue a mention of the use of arecolin in the treatment of metritis. I can see no great advantage in using this drug in such a condition. The writer of the article referred to, says that he also flushes the uterus with a warm antiseptic solution. I think if he will fill the uterus two or three times with his solution and siphon it out completely each time, as he says he does, the uterus will naturally contract, whether the arecolin is used or not. In other words, I attribute his success to his thorough irrigation of the uterus, and not to the effect of the arecolin.

Perry, N. Y. FRED C. CLARK.

OPEN JOINTS

The editor has asked me to write something about the treatment of open joints with cataplasms principally. This mode of treatment suggested itself to me after trying everything else with most disastrous results. I have not treated any great number of cases, but so far the treatment has proved about ninety per cent efficient.

It seems that for some reason not satisfactorily explained, as soon as we have an opening into a joint cavity with escaping synovia, the exposure to the air causes great pain to the animal. If we then can only protect the wound from exposure it is of value in that it relieves pain. If we can further render the wound aseptic and keep it in this condition, there is no doubt about nature doing the rest. The great difficulty in accomplishing this is on account of the at first nearly constant movement of the joint, which displaces most all applications.

Cataplasms such as antiphlogistine, Denver mud and other preparations of Fuller's earth with glycerin and salicylic acid, are quite adherent and supported by bandages, seem to be the most feasible agents. It will also allow for some drainage which is essential in the beginning of the treatment. I have also demonstrated that this agent can be made to serve even where it is impossible to keep bandages in place. I surmise that the success obtained by this treatment is due to the protection from extraneous matters. It also softens the tissue and probably increases phagocytosis. It is indicated because of the salicylic acid being very antiseptic and stimulative to the wound, which promotes healing.

I have used polyvalent bacterins in conjunction with this treatment and believe that they help to build up the resistant powers of the blood to invading bacteria.

Case No. 1: Black horse, age 5 years, weight 1,300. Open hock-joint from a kick by another horse. A period of several days elapsed before I was called.

Animal unable to bear weight on the affected member, synovia purulent in character escaping from a wound on the external lateral posterior aspect of the articulation. Considerable swelling and pain in evidence. Temperature 105°F. Treatment was begun along older lines, namely by cleansing the external parts thoroughly and attempting to flush the joint cavity with antiseptics. In this I fear I was not very successful as a larger opening would have been necessary to accomplish the desired results, and I was afraid it would not look good to the owner to use the knife at that

time; besides, I was not very confident of the results if I had done so.

After this attempted irrigation red iodid of mercury suspended in oil was injected into the joint and a protective swathing of cotton and bandages was applied. An injection of polyvalent bacterin (Kinsley) hypodermatically was also administered. This treatment seemingly aggravated the case. In two or three days the pain and swelling were worse than at the beginning of treatment.

The owner was informed that further treatment would be useless. He, however, insisted on treatment as the horse was a valuable one. Having had very good results with antiphlogistine in other inflammatory disturbances, I decided to try it in this case and the owner was informed about the difficulties of keeping the application in place. He agreed to take care of that part.

Antiphlogistine, previously warmed, was applied about half an inch thick, enough to encompass the whole swelling with roller bandages to keep it in place. This application slipped some at times, but the owner was there at all times to readjust it.

In about 12 hours the horse appeared much easier, beginning to rest the affected leg timidly on the toe. The temperature went down two degrees. The application was renewed in about 36 hours, when another opening on the other side of the joint was discovered with synovia escaping, but not so purulent in character. The temperature was nearly normal at this time and the horse was able to bear considerable weight on the leg. These applications were continued as often as needed and in about ten days the horse was practically well. This took place more than two years ago, and today this horse is perfectly sound. No enlargement or impediment of the joint is discernible.

Cases Nos. 2, 3 and 4: These were a two-year-old filly, draft type, and two old geldings "running to the straw-pile" where also a boar with large tusks, was allowed to run. This boar tore open the stifle joint on the filly, the hock joint on one gelding and the pastern joint on the other one. All three were treated with Denver mud as outlined above and two doses polyvalent bacterin apiece. They all made good recoveries in about ten days.

Case No. 5: Family cow, herded with other city cows by some boys, had in some manner come in contact with some sharp object which cut into the metacarpo-phalangeal joint of the left front and hind legs. Both wounds had been treated with kerosene for some days before other aid was sought. Purulent synovia was escaping from both wounds, temperature 105° F., cow unable to assume a standing position. Treatment consisted of cleaning the external parts of the wounds. Denver mud was applied warm and thick and renewed every 48 hours for about six days, the opening into the joints being closed at this time. The wounds were treated as ordinary wounds and were all healed in about four weeks. Three injections of polyvalent bacterin was also part of the treatment.

Case No. 6: Buck-skin mule, aged 8 years, weight 1,050 lbs. Open stifle joint from kick by its mate. This condition had prevailed about three days before treatment was called for, but from all appearances no infection had occurred. Some swelling and lameness but inability to bear weight not complete. Denver mud supported with bandages was attempted but all efforts to maintain them were in vain. The mule succeeded in getting the application off and synovia continued to escape. I then gave up the bandages and merely smeared the Denver mud over the wound including the swelling as much as would readily adhere, sticking a piece of muslin on the mud. The stable attendant was also instructed to smear on more mud as often as it was washed away by the synovia. The synovia stopped in about 48 hours, and an uneventful recovery was completed in 10 days.

Brainerd, Minn. C. A. NELSON.

SCOUR IN CALVES YIELDS TO FORMALDEHYD AND CAMPHOR

Early in April, 1919, I received a telephone call asking me to put up some medicine for calf scour and send it out in the country several miles by a milk hauler. I questioned the man and found out as much of the history of the case as I could, learned that the owner did not want to pay much for the medicine, that he had tried several remedies on other calves and they had died, so he did not believe anything would do much good. However, he did not want to let these calves die without attempting something, so had as a last resort telephoned to me for a remedy, which he had no faith in no matter what it might be.

I prepared a bottle of medicine for him composed of formaldehyd, one part, carbo-camph, two parts, and water, three parts, with directions to give one teaspoonful in a half teacup of milk every four hours until the desired effect was obtained. I sent it as requested, and several weeks later I met the farmer, all smiles and ready to pay almost any price for that "calf saver" as he had named it. He said he had saved four calves by using that medicine and that they were all doing well. As I never saw the calves, I could only conclude that they were affected by that form of white scour that is associated with contagious abortion of cows as I learned that several cows had aborted on this farm during the past year.

Poplar Grove, Ill. C. B. HAWES.

A CASE OF MESENTERIC SARCOMATOSIS

Bay mare, pony, very fat, 7 years old, never had been sick or showed any sign of failing health. Belonged to local physician, whose little boy rode the pony every day. I was called early one morning, and on arriving found the whole family mourning. The doctor said he found the pony dead in the morning when he came out to feed it; that it had

eaten its supper and seemed to be O. K. the night before. We held an autopsy.

Findings: Heart and lungs normal. Stomach had several fibrous growths, pale red in color about the size of a marble. The mesenteries, we estimated, had from three to five hundred of such growths. The small intestines were covered the same way. A few growths on the posterior part of the cecum. The liver was a mass discharging creamy pus,

about half the right lobe being sloughed away. The rest of the alimentary canal was free from these growths. All of the growths were about the same size and color. I believe this case to be a rare one.

Diagnosis: Cancer; one of these growths was sent to a Kansas City laboratory, and in a few days a letter came which said "sarcoma."

I enclose two photos of this case. The white dots show the growths. No. 1 shows the left lobe of liver in hand, the right being gone.—O. C. R., Okla.

IMPACTION OF COLON PERSISTS FIVE DAYS AND PATIENT RECOVERS.

Brown coach mare, aged 7 years and weighing 1050 pounds. The driver found her sick in the morning. I was called and after obtaining the history, method of feeding and symptoms, I diagnosed the case as one of impaction of the colon. I administered a capsule of one ounce chloral hydrate and one and one-half ounces aromatic spirits of ammonia and half an ounce of nux vomica, followed by a physic bolus. Returned at noon and there was no change in her condition, and I gave her another dose of aromatic spirits of ammonia and injected a half grain of arecolin, one-half grain of strychnin, one quarter grain of lobelin, and this was followed in an hour with about four miles of slow exercise with the bowels evacuating only once and but a very small quantity.

I called again at 9:00 p. m. and gave another capsule of one ounce chloral hydrate, and the driver said she remained quiet the rest of the night.

I left a bottle of a colic mixture and instructed him to give her three or four miles of slow exercise, which he did, and on returning he called me saying she was in great pain, and on arrival I gave another ounce of chloral hydrate, and a physic bolus, and while she had some pain that night she would rest comfortably at times. I called again the next day and the stable driver said her bowels had moved once during the night. I then injected one-half grain of arecolin, one-half grain of strychnin and one-quarter grain of lobelin, and got one evacuation of the bowels with a quantity of gas. She was driven about two miles in the afternoon and came in showing signs of pain and as soon as she was in the stall she began to roll and kept looking around and at times biting her side. A few doses of colic mixture soon quieted her and she was quiet the rest of the night.

The next day her condition was unchanged. I returned at noon and gave a capsule containing about one ounce of ammonium carbonate, followed by a drench of one quart of linseed oil, and two ounces turpentine, and then with a little exercise, which distressed her very much, she was put in, but did not have much pain.

I saw her again at 11:30 p. m. and she was quiet, and I told the driver to give a half ounce of tincture of nux vomica in the morning, and to drive her slowly, and in a half hour after hitching he drove to the office to have me see her. That the bowels had been moving vigorously was evidenced by the front end of the expensive carriage to which she was hitched. She was put in a standing stall and has showed

no further signs of pain and seemed to be none the worse for her five days lay-off.

During the five days that she was ill she would eat sparingly of hay and drink water in small quantities, and at no time was the pulse over 45, temperature 101° F., and respiration 22. —D. A. I., Vermont.

ANTI-HOG CHOLERA VACCINATION.

Your editorial "Drifting" in the October issue, is certainly worthy of serious consideration at the hands of all practicing veterinarians in this state, and should be discussed at the coming association meetings, with a view to providing a remedy, if such a condition exists to any extent. We agree that there must necessarily be some variation in the scale of charges in hog cholera vaccination. At the Eastern Iowa Association meeting at Muscatine I talked with several southeastern Iowa veterinarians, regarding their methods of vaccination and their average charges in such cases. It seemed to me from what information I could gather that their methods and charges about compared with those of veterinarians in northeastern Iowa with whom I am more in touch.

The average charge appears to be about two cents per c.c. for serum and virus, the cost of the serum being largely the determining factor. No doubt there are cases where a lower charge is made, and others higher, when a clear serum is used, the best product is demanded, the cost being of minor consideration.

The veterinarian's charges then must of necessity depend largely upon the cost of serum, in the quantities needed to meet with the requirements of his practice, and while it is true that large quantities of this perishable product, can be had from the manufacturer at less cost, still the average veterinarian is not usually prepared, neither is it advisible, to keep on hand an amount largely in excess of his immediate needs for any length of time, the fresh product being always preferable.

It is true that many farmers put off vaccination on account of the cost, and some would prefer to do nothing, and say nothing, only let their hogs die. Such neglect would result in further spread of the disease, but I cannot imagine that any community in Iowa would tolerate this for any length of time. The neighbors and the county farm expert are on the alert for just such cases, and would soon demand an investigation. Such cases however do occasionally exist.

Our state animal health commission is composed of four live stock men and three veterinarians, to them all inequalities or exorbitant charges (if they exist) should be submitted. The matter would no doubt receive prompt investigation, and would result in prompt relief, such as the situation warranted.

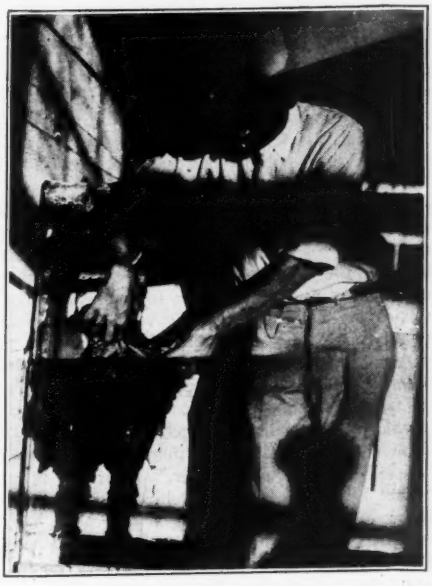
It always has been my firm belief that the handling of hog cholera serum and virus should be under strict state supervision, as is now the case with tuberculin. Such products should be supplied by the state to the farmer or breeder at cost plus express charges. There could be a central supply station in each county, and each transaction reported through the representative of the animal health commission in that county. The commission of animal health may ask for bids on serum from the producers, and could no doubt purchase in large quantities at much less cost than could the average practicing veterinarian.

It is imperative that he who has charge of a county, be a qualified veterinarian. His work would consist largely in the supervision of the distribution of hog cholera serum and virus, the control of hog cholera and the eradication of tuberculosis. The state and the county combined could afford to pay a good salary to a qualified veterinarian, for these county positions.

Charles City, Ia. J. H. McLeod.

TRAUMATIC PERICARDITIS IN COW

The accompanying photograph shows traumatic pericarditis in a cow. This cow failed to come in with the other cattle one night. She was found dead in the pasture the next morning.



On postmortem examination, a hog wire, 4½ inches long, was found extending from the stomach through the diaphragm into the heart. The pericardial sac contained several gallons of yellow, offensive smelling fluid. The heart weighed 21 pounds.

Union Springs, Ala. J. S. Cook.

FORAGE POISONING OF TURKEYS, NOT BLACKHEAD

I have read Dr. Perry's report of forage poisoning in turkeys in the November issue. He has not given any lesions of blackhead in his postmortem findings, and I do not agree with him that blackhead is forage poisoning. Birds are very susceptible to spoiled feed, and he may have been dealing with forage poisoning, but he is wrong in calling it blackhead.

In our experiments, we have had blackhead always develop in poults at about ten to twenty weeks of age where they are raised with hens, even on farms where turkeys have never been raised so far as history could determine. There is no question but that blackhead is due to a protozoan. We have had poults come down over and over again where they had no chance to get forage of any kind except that given them.

I wish Dr. Perry would read over the description of blackhead given in "Poultry Diseases," and report further if the symptoms and lesions he observed were similar to those described in my book.

West Raleigh, N. C. B. F. KAUPP.

CENTRAL ILLINOIS VETERINARY PICNIC

The Central Illinois Veterinary Association held a very interesting meeting in the heart of the great corn belt, October 23rd. Those attending were met at the train at Farmer City and transported in autos to Sweigert's Cabin, a distance of 10 miles where the meeting was held. The Cabin is a genuine pioneer's log house, standing in a picturesque spot, a wooded hill sloping toward a small stream. It is without a single modern improvement, except for the small electric light plant. Even its shingles are handmade, and the floors of native clay. The landlord of the hostelry who fits the surroundings exactly has a standing offer to the whole world to provide a gallon of a now very rare beverage to any man who can equal him in the lost art of shingle splitting. The cabin was chosen as the meeting place for the Association particularly for its famous banquet dinners. It was well chosen. Two excellent man-sized meals were served. At supper two violins and a piano played "Money Musk," "Old Dan Tucker," "Turkey in the Straw," "The Girl I Left Behind Me," and other music of the backwoods of a generation ago—in fact there was nothing modern in the whole affair except the science of veterinary medicine and the prosperous looking automobiles—the charm and manners of our grandfathers' days were maintained throughout, in the rude surroundings and our host's hospitality.

Dr. J. I. Gibson of the Purity sang one hundred verses of "Good Old Soul" and received great applause at the conclusion of each verse. The host did a clog dance and responded to half a dozen encores. Further entertainment was provided in the evening by a spirited sparring match between local talent. In the morning, quoits on the green, played with horseshoes, was the main event. The booby prize at pitching horseshoes goes to Mr. I. C. Brenner, of the Peerless Serum Co. Brenner managed to ring many of the spectators, and numerous trees within a dozen to twenty yards, but neither of the posts.

At the meeting proper no formal program had been prepared, but the President, Dr. T. J. Foster of Monticello, as chairman, called upon various members and guests present. Among the discussions of general interests were the following:

DR. R. E. NESBITT, Clinton, Illinois: I do not think that as a rule veterinarians recognize sufficiently the liability of frequent outbreaks of hemorrhagic septicemia among horses. I was called to a case recently where the man had lost one animal when I arrived and had three others down, one almost dead. There were 17 horses on this farm. I posted two of the dead ones and it appeared to me to be hemorrhagic septicemia. I called Dr. Schwarze of the University. He posted two of the horses and found nothing. He did not question, however, my diagnosis, and finally when he had returned to the laboratory located the bipolar organisms from specimens taken from these cases. I believe that in many cases of loss of horses where in the past we have called it cerebro-spinal meningitis, forage poisoning, etc. the trouble is hemorrhagic septicemia, and that h. s. bacterins should be given exposed animals at once.

DR. H. R. SCHWARZE: Probably the most interesting thing about the case just mentioned by Dr. Nesbitt was the symptoms. It seems these animals would take sick very suddenly. They would go down in a very few hours and inside of 24 hours would die. The first symptom presented by them really was that of pleurisy. However the treatment took no effect at all, the animal would go down and die in a very short time.

From the horses posted and what they described to me, they found lesions characteristic of hemorrhagic septicemia. The five horses that were down when I was there were lying in a rather comatose narcotic state. The reflex actions appeared as though the animal were sleeping. They would move a little when stirred. There was no nervous action of any kind present. There was no congestion of the mucous membrane anywhere. Another thing was the temperature. These animals carried a very high temperature at the beginning of the disease. About the time they went down the temperature dropped to normal and stayed there. We destroyed one of the animals that was down and I failed to find any lesion whatever on the animal. I would not say to the owner that it

was not hemorrhagic septicemia, although I could not find any lesions and of course could not say that it was hemorrhagic septicemia. They had informed me that they treated these horses with bovine hemorrhagic septicemia bacterin. To give the owner the benefit of the doubt, I told them that they had better treat with equine hemorrhagic septicemia bacterin if they expected any results, so they got equine hemorrhagic bacterin and treated the horses. I took material back to the laboratory with me and examined it and tried to isolate the organism. I was successful in isolating the organism. But the laboratory animals used for inoculation were shipped from Springfield, immediately before I used them. So I do not know whether I inoculated them with material from the horses or whether they contracted the disease en route. In a short while he said that another horse was down. I went right there and thought maybe I was on the wrong track. I had seen four outbreaks in horses identical to this one. I had always thought it was some kind of forage poisoning. Not getting any benefit from the bacterin treatment I took some anti-botulinus serum and thought we would give them a trial to see if there was any botulism there. I posted these horses that were down and did not find anything, they were just as clean as the other horses. So I took material from the stomach and the bowels back to the laboratory and investigated it from the forage standpoint and also treated the animals with botulinus serum. Soon another horse took sick, the anti-botulinus serum had done no good. I went there again and autopsied that horse, and found a very few lesions characteristic of hemorrhagic septicemia. Some on the spleen, and two lymphatic glands were hemorrhagic. I took material back to the laboratory and made investigations for hemorrhagic septicemia again and isolated the organism. The material was so virulent that in six or eight hours it destroyed my animals. Autogenous bacterins were made and administered to the remainder of the animals and there were no further losses.

I might say in this connection that I was called in consultation several years ago to a farm where they had a condition similar to the one just described. We autopsied those animals and could not find anything wrong. That same year I saw two more outbreaks that were identical in occurrence and symptoms and also in presenting no lesions. I have met in a number of instances cases of undoubted hemorrhagic septicemia in horses, but the symptoms and lesions were considerably different than they were here. As I say, the principal symptoms on the whole were a comatose state. Raise them up, try to get them to drink, and they would try to drink and eat and drop right back and go to sleep. The horses usually affected on the farm were animals that had been working during the day and were put in the barn in the evening but allowed to feed on a light green grass night and morning. That happened to be the case in every instance. We switched those feeds around from every angle with absolutely negative results. Later on the same feeds were given to different animals, after the disease seemed to have run its course and there were no bad results. And in the last outbreak the owner in changing around on feeds finally took the animals that he had running in the pasture day and night and put them in the barn and fed them in the barn and put them

Central Illinois Veterinarians Picnicing in the Woods.

out in the daytime. Several of these cases finally developed hemorrhagic septicemia. That was the only case different from the rest of the animals. The animals that had been working hard during the day and allowed to get dry feed but at the same time were turned out in the pasture nights and mornings. Those that were running in the pasture day and night did not develop the disease and those kept in the barn and kept on dry feed all the time did not develop it either.

Poor Vaccination the Owner's Fault

DR. J. I. GIBSON, Bloomington, Illinois: Now I am interested more in the vaccination of hogs than in any other problem. I have learned of some inferior vaccination, if I may put it that way, and I want to say to you that the breeders of pure-bred swine are to blame for some faulty vaccination that I know of in Central Illinois. I have heard of instances where the swine breeders have called their veterinarians and asked them to give them a makeshift, make-believe vaccination, just to get by with, and to prepare for a sale. I know of one instance where a breeder wanted a veterinarian to give him just a get-by in the way of vaccination. I am glad to say, that the veterinarian promptly informed him that he could not give him a half-way vaccination, that if he vaccinated his hogs he must vaccinate them according to the most improved methods, for conferring a permanent immunity to those hogs. He told the man, "No matter to whom you sell those hogs they will prove a satisfactory investment only if properly immunized and only then can they be a good advertisement for you."

I know of other instances where practising veterinarians in Central Illinois have been influenced or persuaded by swine breeders to give a light vaccination. The result was bad. I do not know whether it was cholera the hogs broke out with or not. They were shipped to Chicago. I endeavored to get a post mortem report on them but failed. In this case shoats averaging 28 lbs. received 12 c.c. of serum as against a moderate dose of virus. I want to say, gentlemen, that if I knew it I would not sell serum to any veterinarian who would attempt to vaccinate hogs that way. There is no such thing as half-way vaccination. When you vaccinate hogs you must give them a proper dose of serum. Then you may give them any dose of virus you desire to give them, and the result will be all right.

I mention this to warn you, that you must not listen to any owner of swine who tries to get you to give a half-way, feeble vaccination because he is going to sell his hogs. You can not afford, to go out and give anything less than a first-class vaccination. Don't allow any man now and henceforth to induce you to give him a makeshift vaccination.

B. A. I. Investigation of Diseases of Young Pigs

There is much that might be said along the line of sanitation in connection with the handing of hogs and the vaccination of hogs. I am glad to know that the government is putting forth an effort to demonstrate in McLean County what may be done in the protection of the on-coming crop of pigs. In this experiment they are going to require that the brood sows and their surroundings shall be sanitary, to the best of their knowledge and ability, and after the farrowing in the breeding pen, when the pigs are to be moved with their mothers to the individual pen in the hog pasture, that the pigs shall not even be driven across ground that may be infected ground, but they shall be hauled in disinfected wagons, and reared in the open sunlight.

Stockyards Disinfection a Necessity

Not much is being done in Illinois looking toward railroad sanitation in the handling of hogs or other live stock. In the light of all experience and especially in the light of the government's experiment last year concerning the fly as a carrier of cholera, I submit to you that it is criminal negligence to pay no attention to railroad sanitation. The railroad yard, the average country railroad station, railroad pens are veritable cesspools, incubators of all diseases of live stock. With the wear and tear of business, these local railroad yards become more or less inundated, and instead of being properly drained, which must go with all reasonable sanitation, they become cesspools into which surface water runs, and it is a shame to admit that our good live stock breeders, of cattle and hogs, when the day comes to ship their live stock from their local station, must put on their hip boots in order to get their live stock through local railroad pens and get them loaded on the train for the market. A railroad yard for the assembling of our finished product, beef and pork and mutton, should be a sanitary place, should be a properly drained place, so that a farmer could take his live stock to the yards for shipment without putting on anything extra to protect him from the mud and filth. Therefore, I claim that one movement we should make in sanitation is to require the railroads in Illinois to properly drain their yards and to put proper flooring in their stock yards. I might go back to the time when we started in cooperation with the Bureau of Animal Industry in Dallas County, Iowa. We had that kind of railroad yards, dirt cesspools; we went to the railroad authorities and asked them to drain these yards and put them in sanitary condition and keep them so. It was uphill work to start with. But we did prevail upon them, and got them into it. After that they were glad to do it every year. They saw themselves that it was a good business proposition to offer to the shippers of live stock decent, clean, drained stock

pens in which to hold their stock before loading. In Dallas county, Iowa we had some new yards installed after we started that movement and the first thing they did was to lay out the yards and alleys to the pen and to cement the whole with proper drainage gutters and afterwards to build the yard fences.

Stock Car Disinfection the Most Important Sanitary Measure

Next to the importance of the railroad yard comes the proper car to load the stock in. The car in which to load stock that is coming in for feeding purposes. Before leaving Iowa I succeeded in putting through the following rule: All stock cars used for shipping live stock, horses, cattle, sheep and swine into or within the State of Iowa, for feeding purposes, shall be cleaned and disinfected before the live stock is loaded. By that rule we sought to protect from infection in transit all live stock brought to the Iowa farmer.

You all know that during the foot and mouth disease epizootic a general disinfection of live stock cars was required. The history of that cleaning and disinfection is that an average of 5,000 pounds of this dairy litter was taken out of the live stock cars in this country. The government's record is 16,000 pounds or 8 tons of litter taken out of one stockcar. The railroad officials, meeting us at the livestock sanitary convention in Chicago complained about hardship in disinfecting their cars. One year later the same railroad officials stood in the same sanitary convention and said that they ought to thank the various state and national authorities for requiring them to clean and disinfect their cars, because they fond the condition in which they were keeping their cars not only rotted their floors but the timbers under the floors.

The Dominion of Canada has universal stock-car disinfection. If you order a car you get a cleaned and disinfected car. About 75c per car is what it costs. It might cost $1 a car in this country. If every car was cleaned at the end of the journey, the cleaning of that car —putting in proper bedding (a not superfluous amount) of hay, straw or even clean sand, and disinfecting throughout, would be a matter of slight expense. One dollar per car would give us universal stock car disinfection in this country. That dollar, if charged to the shipper in the long run would probably be the best dollar that shipper ever invested. It would apply also to what the shipper brought in. In Dallas county we had cattle and other stock shipped in very dirty cars, through dirty yards and after the proper period of incubation in many cases after arrival on the farm the hogs broke with cholera. We had every reason to believe that the cattle carried cholera infection from the dirty cars to the farm. I personally believe that a universal car disinfection rule, properly lived up to, in this country, would mean more in the protection of the live stock industry against diseases, than all other sanitary rules and regulations combined.

Why Dairy Cattle Become "Feeder Cattle"

They have reversed some of my rules since I left Iowa. For years we used the feeder affidavit, which admitted bulls, cows and heifers on the affidavit that they were for feeding and slaughter only. Years of application proved to me that the regulation was a farce, that the affidavit was a farce. And before I left Iowa we had in action a rule that said that all bulls, cows and heifers over six months of age shipped into the State of Iowa must be accompanied by a certificate of tuberclin test. We put that in effect supplanting the original affidavit. They have since revoked that, and have gone back to the affidavit. My own conviction is this: We received from South St. Paul a large number of carloads of mixed animals on affidavit for feeding purposes only, and the man who bought them might be ever so honest, intending to feed them just as he would so many steers, but the fact is you want to look with suspicion upon any young bull, cow or heifer with any points whatsoever indicating dairy ability, that reaches the public stockyards. Why did it get there? I'll tell you why. Because the original owner found it was not satisfactory. He found that out largely as the result of tuberclin tests made for his own information, so this cow (we will leave the bull out) or heifer, left her original home because she was known to be unfit to remain there. That is why she reached South St. Paul. She gets into that mixed herd, and is shipped into Iowa on the affidavit that she is for feeding and slaughter only. As time goes on the golden corn that is raised in Iowa (and in Central Illinois just as well) gives her a boost. She improves and looks good.

Fallacy of the Owner's Affidavit

The man who is feeding her may be honest, but several things come up. First she is pregnant, which may interfere with his plans at marketing time, through meat channels. At the same time the local dairyman finds there is a time just ahead when he will be short of milk, and he says to himself and to his wife, "I must go out and get some fresh cows." He drives out to look for what he wants and sees this cow that originally left Wisconsin or Minnesota, or somewhere because she was known or believed to be tuberculous. But she looks fine now. He finds the owner and says, "John, you've got five or six cows there that I need in my dairy. They are going to be fresh, and I'll give you so much for them." His offer may be as good or better than the owner figures he will get through meat channels, and he sells them. About the same time there is another neighbor expecting a baby to come to his home, and to make sure that they will be able to take proper

care of the baby he goes out to look for a cow that will be fresh at the proper time. He sees this same herd. He sees a cow that suits him and takes her home. She will be there as a reserve for his coming baby when the time comes, and she is the same cow that left her original home because she was known or suspected of being tuberculous. The feeder affidavit covering these animals is not the proper regulation for the reason that you cannot police the entire country.

Mixed Infection a Misnomer

I meet men in the profession who seem to think that mixed infection is a definite form of disease. I can not comprehend it in that light. If there be infection of two or three kinds I am willing to call it mixed infection, but if the infection is hemorrhagic, or due to the presence of the bacillus necrophorus, I should be inclined to name that according to what it was. Mixed infection covers a multitude of sins. I am anxiously waiting to see what the first report of the special committee on swine diseases of the U. S. Live Stock Sanitary Association will say. Gentlemen there isn't any meeting in this country that it will pay you better to attend than the U. S. Live Stock Sanitary Association meeting in Chicago the first week in December. There is also the fat stock show and a meeting of the Illinois Veterinary Medical Association at the same time. One of our members is the secretary of the U. S. Live Stock Sanitary Association, and a splendid program is offered. I urge you to attend

Dr. G. B. Blackman, Bloomington, Illinois: Some of us who hang to the term mixed infection want a substitute, but until we can definitely distinguish anything else we have got to stick to the term mixed infection. It has happened to most practitioners who do a great deal of vaccination, they have a condition where infection develops in a herd after they have partly immunized that herd against cholera. I hate the term mixed infection myself but for a better one I do not know what to suggest. If we could prove the etiological factors in this mixed infection as we term it, then somebody could name it. When we stop to think about hemorrhagic septicemia in swine I believe I would be safe in saying thirty or more years have passed since that organism was demonstrated. There is still room for study and work along that line. This year seems to have been a most unfortunate year in all work all through this and other states.

In regard to sanitation, I believe the government movement in experimental work that is to be carried out at Bloomington will give the best reasons for showing the farmer what sanitation will do. Sometimes the farmer turns out to be a wonderful sanitarian. I was out north of Bloomington where a farmer had tried to raise hogs for years on a farm and especially in the last five years he has had heavy losses. Then he sold the east end of his farm and moved to the west end. Moved out into a new territory where hogs had never been kept. Five years of cholera with the assistance of veterinarians, and he had been losing twenty-five per cent and even 50 per cent. He moved over. This year he has the finest bunch of hogs I have ever seen, and with disease all around him, he is surrounded by it. Just from moving them off the old infected area where his hogs had been running. Now that looks to me to be definite evidence of what sanitation will do. I believe in this work where they have instructed that the hog lots be rotated as they do their crops, figuring out the life cycle of the ascarid and the various bacterial infections.

Dr. Robt. Graham, Champaign, Illinois: There are some things in connection with the University work which I feel are pertinent to the practising veterinarian, especially the possibilities that have developed. As you already know, the diagnosis work which was formerly done at Springfield has been transferred to the university and they are making an effort to complete the laboratory for this work. In addition to the diagnosis work that was planned, there are efforts being made to continue certain lines of investigation. As has been pointed out by the previous speaker, I feel that this is the one most important thing in the veterinary field, the lack of definite knowledge along certain lines and the progress we can make in this line means progress for the profession at large.

Mention was made indirectly also of the sanitary conditions. There is a definite feeling growing out of the war, which has left a definite impression upon live stock men more than ever before. We find men more interested than they were. They are looking more and more to the veterinarian for instruction along the line of sanitation. One thing which clearly illustrates this comes to us frequently. Practising veterinarians and other veterinarians going from farm to farm without taking the proper precautions, are carrying the diseases from one farm to another. I am guilty and I think others are. In other words, we have more duties today than we had in the past in the capacity of sanitarians, and our duties in the near future will be still more important and I think each one has to figure those things out in his own work.

A recent work by Flexner relative to the roosting places of disease made a vast impression. After all that has been said about influenza, Flexner, in his timely remarks called attention to the fact that the best way and the best methods of controlling infections of this character is to trace them to their roosting places, and there is the place for the veterinarians. Continually pointing out to the owners the roosting place of infections is bound to bring results.

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